COMTREND CORPORATION

CT-5364A

802.11n ADSL2+ Router

User Manual

Version A1.0, July 17, 2009

261091-004

Preface

This manual provides information related to the installation and operation of this device. The individual reading this manual is presumed to have a basic understanding of telecommunications terminology and concepts.

If you find the product to be inoperable or malfunctioning, please contact technical support for immediate service by email at INT-support@comtrend.com

For product update, new product release, manual revision, or software upgrades, please visit our website at http://www.comtrend.com

Important Safety Instructions

With reference to unpacking, installation, use, and maintenance of your electronic device, the following basic guidelines are recommended:

- Do not use or install this product near water, to avoid fire or shock hazard. For example, near a bathtub, kitchen sink or laundry tub, or near a swimming pool. Also, do not expose the equipment to rain or damp areas (e.g. a wet basement).
- Do not connect the power supply cord on elevated surfaces. Allow it to lie freely. There should be no obstructions in its path and no heavy items should be placed on the cord. In addition, do not walk on, step on, or mistreat the cord.
- Use only the power cord and adapter that are shipped with this device.
- To safeguard the equipment against overheating, make sure that all openings in the unit that offer exposure to air are not blocked.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightening. Also, do not use the telephone to report a gas leak in the vicinity of the leak.
- Never install telephone wiring during stormy weather conditions.

CAUTION:

- To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.
- Always disconnect all telephone lines from the wall outlet before servicing or disassembling this equipment.

WARNING

- Disconnect the power line from the device before servicing.
- Power supply specifications are clearly stated in Appendix C.

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NOTE:	This document is subject to change without notice.

Protect Our Environment

This symbol indicates that when the equipment has reached the end of its useful life, it must be taken to a recycling centre and processed separate from domestic waste.

The cardboard box, the plastic contained in the packaging, and the parts that make up this router can be recycled in accordance with regionally established regulations. Never dispose of this electronic equipment along with your household waste; you may be subject to penalties or sanctions under the law. Instead, please be responsible and ask for disposal instructions from your local government.

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Chapter 1 Introduction

The CT-5364A 802.11n ADSL2+ Router provides wired and wireless access for high-bandwidth applications in the home or office. It includes one ADSL port and five 10/100 Base-T Fast Ethernet ports, with one Ethernet port assigned to the Ethernet WAN and the other four supporting LAN traffic. An added USB host port supports 3G wireless dongles and printers. The front and back panels are TR-068 compliant, with colored panels and LED indicators that make for easy setup and use.

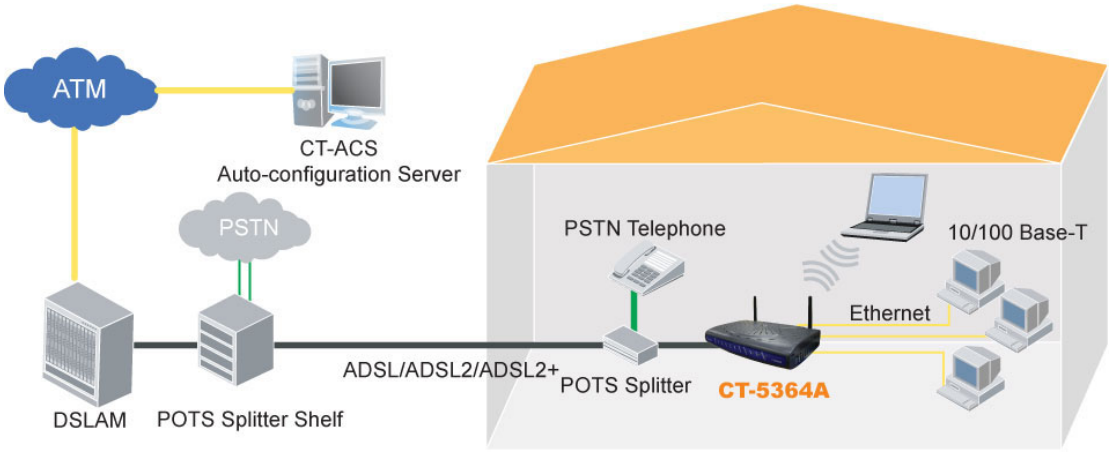
An integrated 802.11n (2x2 MIMO) WLAN Access Point supports faster connections (up to 270Mbps) and increased range compared with 802.11b or 802.11g protocols, without sacrificing compatibility with these older standards. A WPS (Wi-Fi Protected Setup) button is included for easy and secure wireless network setup. Security features include 64/128 bit WEP and WPA/WPA2 encryption, firewall and VPN.

1.1 Features

- 3G Dongle support on USB host
- Printer Server through USB host
- Ethernet WAN or ADSL access
- Auto PVC configuration, up to 16 VCs
- DHCP Client/Server/Relay
- Dynamic IP assignment
- Static and RIP v1/v2 routing
- DNS Proxy/Relay
- Per-VC packet level QoS
- IP/TCP/UDP QoS
- NAT/PAT
- IP/MAC address filtering
- Parental Control
- UPnP
- IGMP Proxy
- WMM
- Integrated 802.11n AP
- 2x2 MIMO wireless antennas
- 802.11b/g backward-compatible
- Wireless Distribution System (WDS)
- Wi-Fi Protected Setup (WPS)
- Strong wireless security encryption
- WPA/WPA2 and 802.1x
- Supports remote administration
- TR-069/TR-098/TR-111 protocols
- Configuration backup and restoration
- Automatic firmware upgrade
- FTP/TFTP server
- RADIUS client
- Web-based management
- Embedded SNMP agent
- TR-068 compliant color connectors

1.2 Application

The following diagram depicts the application of the CT-5364A.



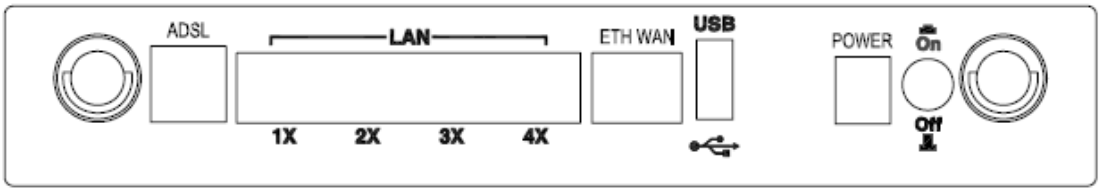
Chapter 2 Installation

2.1 Hardware Setup

Follow the instructions below to complete the hardware setup.

BACK PANEL

The figure below shows the back panel of the device.



ADSL PORT
Connect the ADSL line to the ADSL port with a RJ-11 (telephone) cable.

LAN PORTS
Use RJ-45 cable to connect up to four network devices. These ports are auto-sensing MDI/X and either straight-through or crossover cable can be used.

ETH WAN PORT
Use RJ45 straight through or crossover MDI/X cable to connect to Ethernet WAN.

USB HOST PORT
The high-speed USB2.0 host connection connects compatible USB devices.
This firmware release supports most printers and two brands of 3G usb dongles.

- Consult Appendix F for generic printer setup.
- Consult Appendix G for 3G USB dongle setup.

POWER ON
Press the power button to the OFF position (OUT). Connect the power adapter to the power port. Attach the power adapter to a wall outlet or other AC source. Press the power button to the ON position (IN). If the Power LED displays as expected (see section 2.2 LED Indicators) then the CT-5364A is ready for use.

Caution 1:	If the device fails to power up, or it malfunctions, first verify that the power cords are connected securely and then power it on again. If the problem persists, contact technical support.
Caution 2:	Before servicing or disassembling this equipment, disconnect all power cords and telephone lines from their outlets.

SIDE PANEL

The figure below shows the right-side panel of the device.

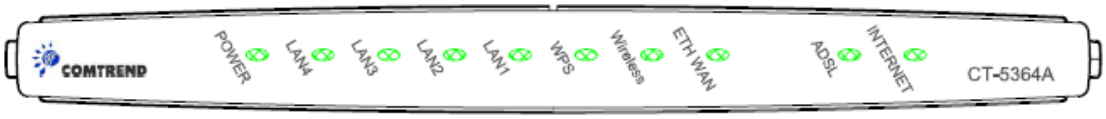
WPS BUTTON
Press this button to begin searching for WPS clients. These clients must also enable WPS push button mode. When WPS is available the WPS LED will be ON.

Reset Button
Restore the default parameters of the device by pressing the Reset button for 5 to 10 seconds. After the device has rebooted successfully, the front panel should display as expected (see section 2.2 LED Indicators for details).

NOTE:	If pressed down for more than 20 seconds, the CT-5364A will go into a firmware update state (CFE boot mode). The firmware can then be updated using an Internet browser pointed to the default IP address.

2.2 LED Indicators

The front panel LED indicators are shown below and explained in the following table. This information can be used to check the status of the device and its connections.



LED	Color	Mode	Function
POWER	Green	On	The device is powered up.
		Off	The device is powered down.
	Red	On	POST (Power On Self Test) failure or other malfunction. A malfunction is any error of internal sequence or state that will prevent the device from connecting to the DSLAM or passing customer data.
LAN 4X-1X	Green	On	An Ethernet Link is established.
		Off	An Ethernet Link is not established.
		Blink	Data transmitting or receiving over LAN.
WPS	Green	On	WPS enabled.
		Off	WPS disenabled.
		Blink	The router is searching for WPS clients.
Wireless	Green	On	The wireless module is ready. (i.e. installed and enabled).
		Off	The wireless module is not ready. (i.e. either not installed or disabled).
		Blink	Data transmitting or receiving over WLAN.
ETH WAN	Green	On	An Ethernet WAN Link is established.
		Off	An Ethernet WAN Link is not established.
		Blink	Data transmitting or receiving over Ethernet WAN.
ADSL	Green	On	The ADSL link is established.
		Off	The ADSL link is not established.
		Blink	The ADSL link is training.
INTERNET	Green	On	IP connected and no traffic detected. If an IP or PPPoE session is dropped due to an idle timeout, the light will remain green if an ADSL connection is still present.
		Off	Modem power off, modem in bridged mode or ADSL connection not present. In addition, if an IP or PPPoE session is dropped for any reason, other than an idle timeout, the light is turned off.
		Blink	IP connected and IP Traffic is passing thru the device (either direction)
	Red	On	Device attempted to become IP connected and failed (no DHCP response, no PPPoE response, PPPoE authentication failed, no IP address from IPCP, etc.)

Chapter 3 Web User Interface

This section describes how to access the device via the web user interface (WUI) using an Internet browser such as Internet Explorer (version 5.0 and later).

3.1 Default Settings

The factory default settings of this device are summarized below.

- LAN IP address: 192.168.1.1
- LAN subnet mask: 255.255.255.0
- Administrative access (username: **root** , password: **12345**)
- User access (username: **user**, password: **user**)

- Remote WAN access: **enabled**
- Remote (WAN) access (username: **support**, password: **support**)

- WLAN access: **enabled**
- Service Set Identifier (SSID): Comtrend_xxxx,
  where xxxx are the last-four digits of the MAC address of the wireless interface.

Technical Note

During power on, the device initializes all settings to default values. It will then read the configuration profile from the permanent storage section of flash memory. The default attributes are overwritten when identical attributes with different values are configured. The configuration profile in permanent storage can be created via the web user interface or telnet user interface, or other management protocols. The factory default configuration can be restored either by pushing the reset button for more than five seconds until the power indicates LED blinking or by clicking the Restore Default Configuration option in the Restore Settings screen.

3.2 IP Configuration

DHCP MODE

When the CT-5364A powers up, the onboard DHCP server will switch on.
The DHCP server issues and reserves IP addresses for LAN devices, such as your PC.

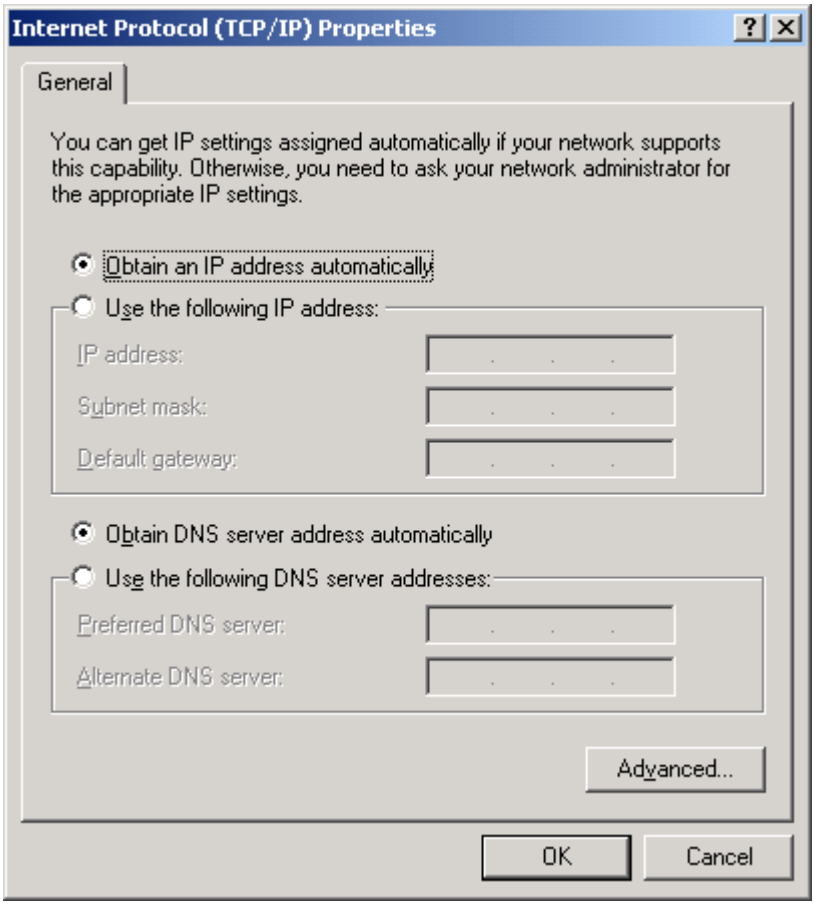
To obtain an IP address from the DCHP server, follow the steps provided below.

NOTE:	The following procedure assumes you are running Windows XP. However, the general steps involved are similar for most operating systems (OS). Check your OS support documentation for further details.

STEP 1: From the Network Connections window, open Local Area Connection (*You may also access this screen by double-clicking the Local Area Connection icon on your taskbar*). Click the **Properties** button.

STEP 2: Select Internet Protocol (TCP/IP) **and click the** Properties button.

STEP 3: Select Obtain an IP address automatically as shown below.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

STEP 4: Click **OK** to submit these settings.

If you experience difficulty with DHCP mode, you can try static IP mode instead, as described on the next page.

STATIC IP MODE

In static IP mode, you assign IP settings to your PC manually.

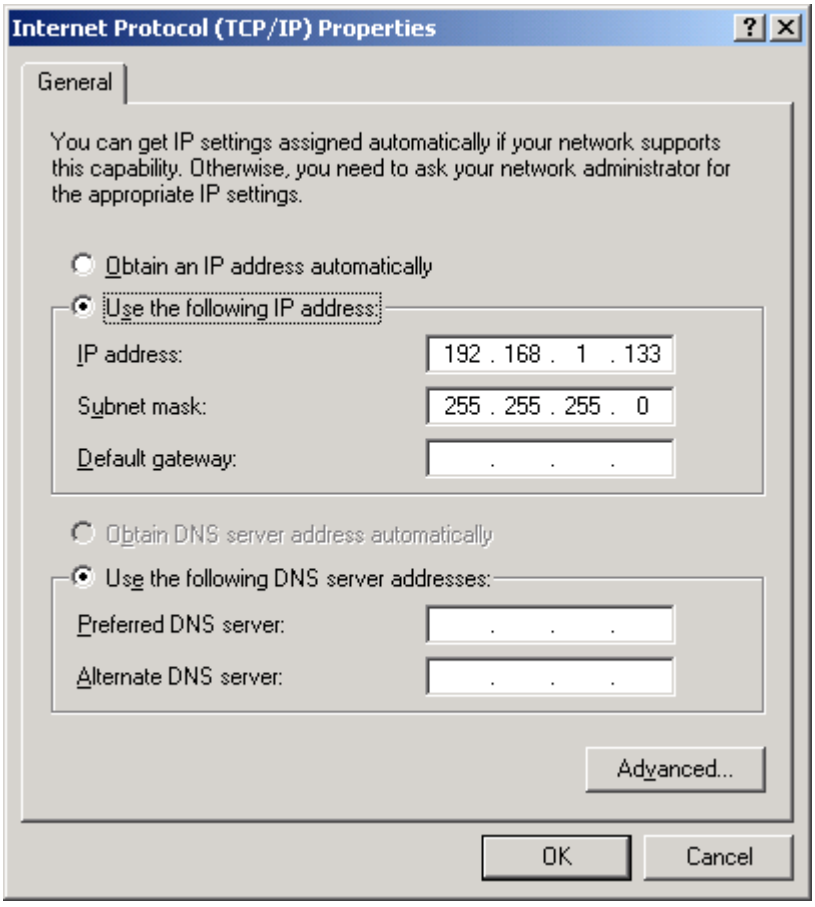
Follow these steps to configure your PC IP address to use subnet 192.168.1.x.

NOTE:	The following procedure assumes you are running Windows XP. However, the general steps involved are similar for most operating systems (OS). Check your OS support documentation for further details.

STEP 1: From the Network Connections window, open Local Area Connection (*You may also access this screen by double-clicking the Local Area Connection icon on your taskbar*). Click the **Properties** button.

STEP 2: Select Internet Protocol (TCP/IP) and click the **Properties** button.

STEP 3: Change the IP address to the domain of 192.168.1.x (1<x<255) with subnet mask of 255.255.255.0. The screen should now display as below.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 133
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

STEP 4: Click **OK** to submit these settings.

3.3 Login Procedure

Perform the following steps to login to the web user interface.

NOTE:	The default settings can be found in section 3.1.

STEP 1: Start the Internet browser and enter the default IP address for the device in the Web address field. For example, if the default IP address is 192.168.1.1, type http://192.168.1.1.

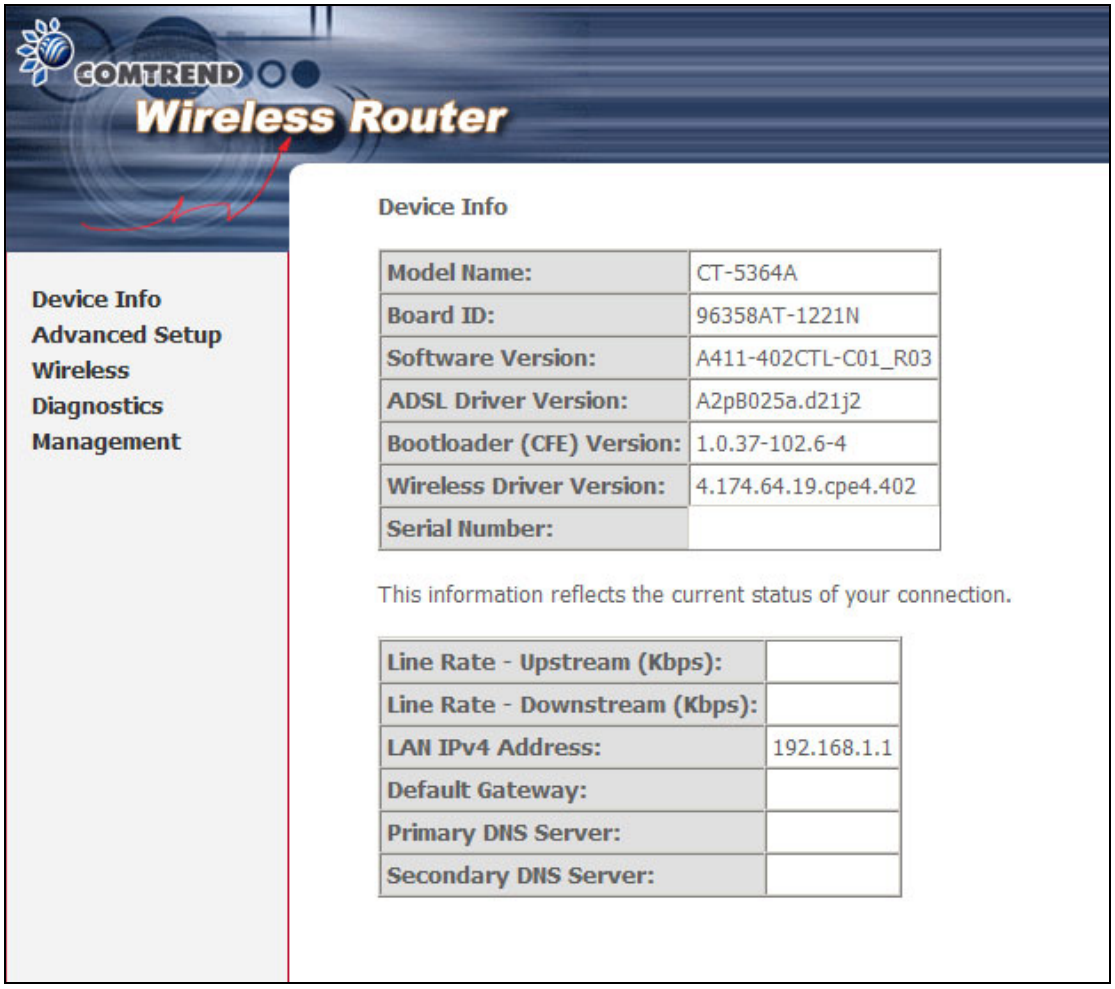
NOTE:	For local administration (i.e. LAN access), the PC running the browser must be attached to the Ethernet, and not necessarily to the device. For remote access (i.e. WAN), use the IP address shown on the Device Information screen and login with remote username and password.

STEP 2: A dialog box will appear, such as the one below. Enter the default username and password, as defined in section 3.1 Default Settings.

Click **OK** to continue.

NOTE:	The login password can be changed later (see section 8.5.1).

STEP 3: After successfully logging in for the first time, you will reach this screen.



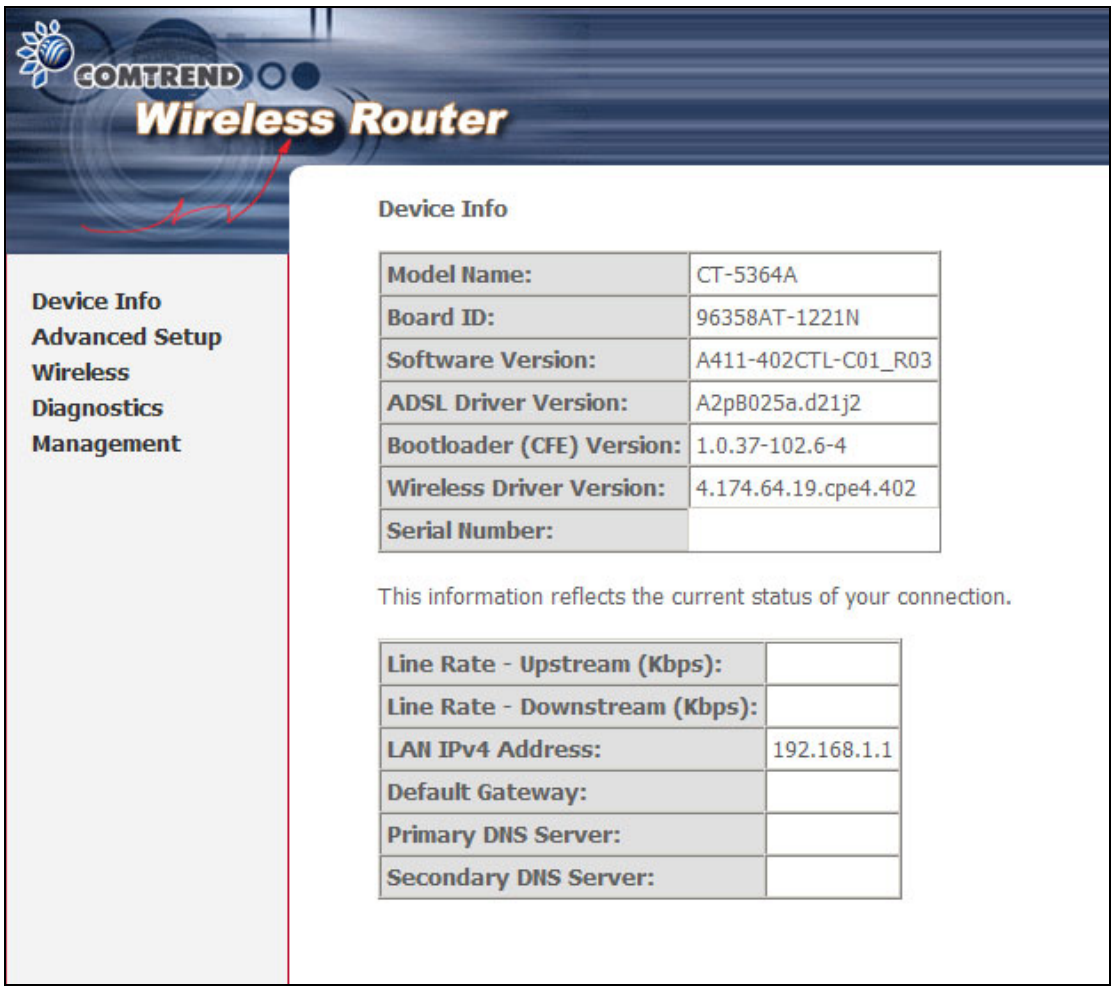
Chapter 4 Device Information

The web user interface window is divided into two frames, the main menu (at left) and the display screen (on the right). The main menu has several options and selecting each of these options opens a submenu with more selections.

NOTE:	The menu items shown are based upon the configured connection(s) and user account privileges. For example, if NAT and Firewall are enabled, the main menu will display the NAT and Security submenus. If either is disabled, their corresponding menu(s) will also be disabled.

Device Info is the first selection on the main menu so it will be discussed first. Subsequent chapters will introduce the other main menu options in sequence.

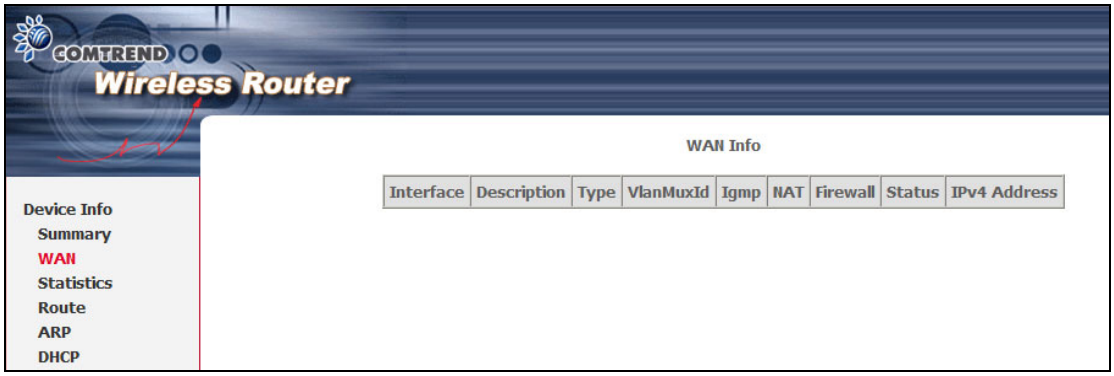
The Device Info Summary screen displays at startup.



This screen shows hardware, software, IP settings and other related information.

4.1 WAN

Select WAN from the Device Info submenu to display the configured PVC(s).



Heading	Description
Interface	Name of the interface for WAN
Description	Name of the WAN connection
Type	Shows the connection type
VlanMuxId	Shows 802.1Q VLAN ID
IGMP	Shows Internet Group Management Protocol (IGMP) status
NAT	Shows Network Address Translation (NAT) status
Firewall	Shows the status of Firewall
Status	Lists the status of DSL link
IPv4 Address	Shows WAN IPv4 address

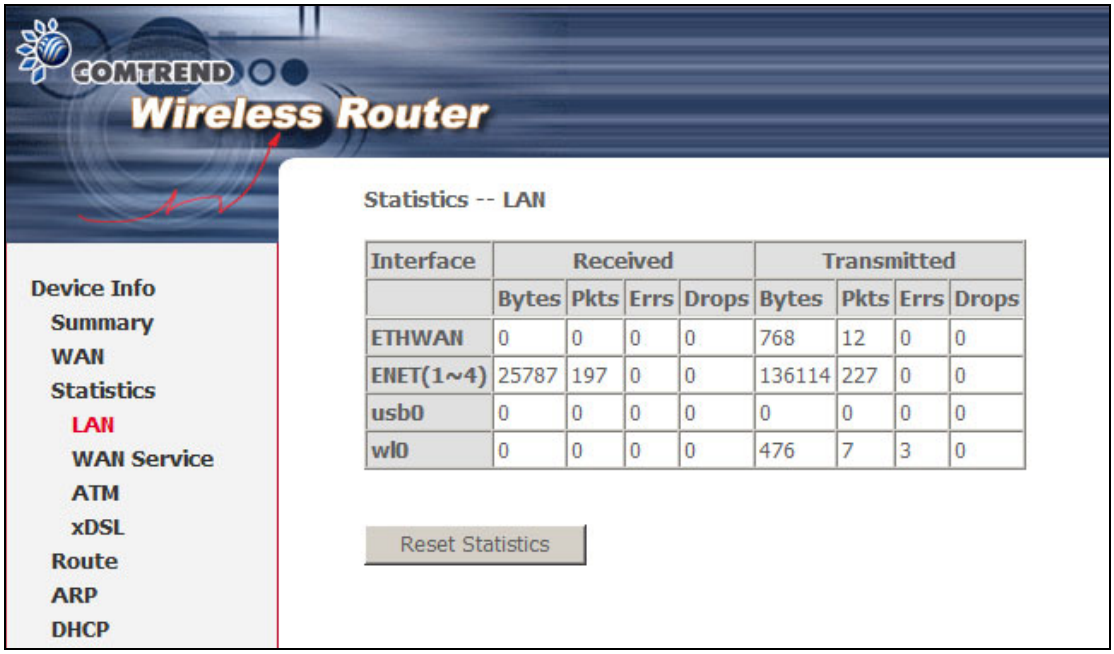
4.2 Statistics

This selection provides LAN, WAN, ATM and ADSL statistics.

NOTE: These screens are updated every 15 seconds.

4.2.1 LAN Statistics

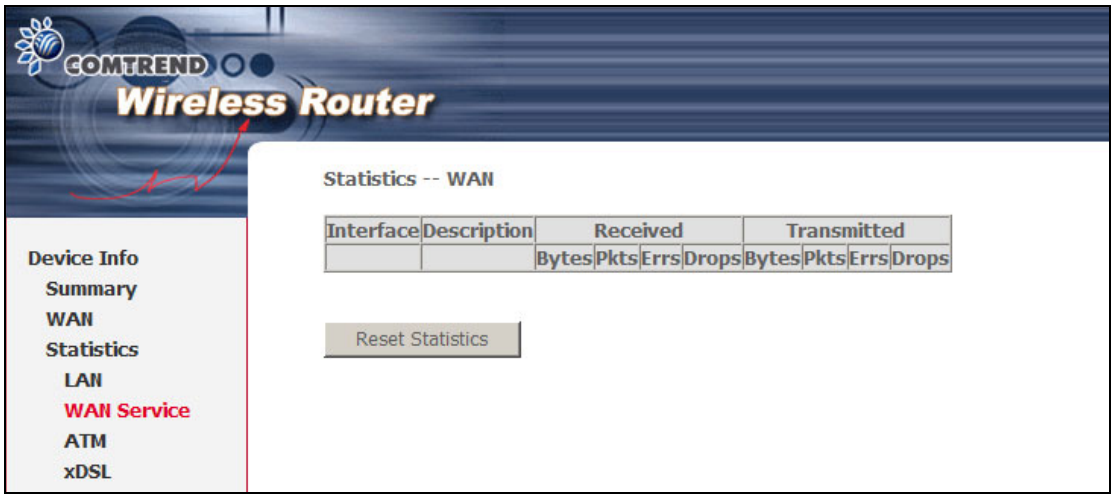
This screen shows data traffic statistics for each LAN interface.



Heading	Description
Interface	LAN interface(s)
Received/Transmitted: - Bytes - Pkts - Errs - Drops	Number of bytes Number of packets Number of packets with errors Number of dropped packets

4.2.2 WAN Statistics

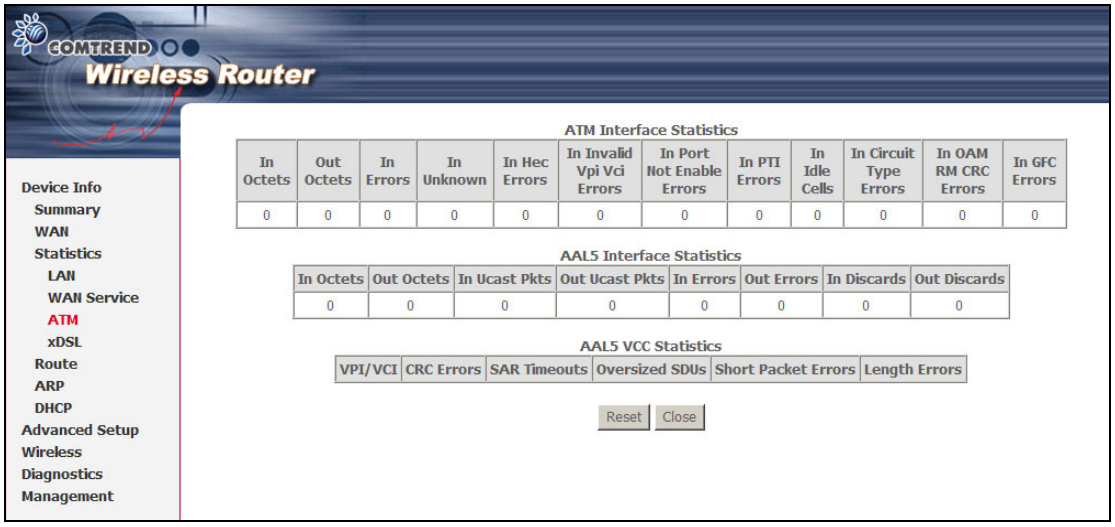
This screen shows data traffic statistics for each WAN interface.



Heading	Description
Interface	WAN interfaces
Description	WAN service label
Received/Transmitted - Bytes - Pkts - Errs - Drops	Number of bytes Number of packets Number of packets with errors Number of dropped packets

4.2.3 ATM Statistics

The following figure shows Asynchronous Transfer Mode (ATM) statistics.



ATM Interface Statistics

Heading	Description
In Octets	Number of received octets over the interface
Out Octets	Number of transmitted octets over the interface
In Errors	Number of cells dropped due to uncorrectable HEC errors
In Unknown	Number of received cells discarded during cell header validation, including cells with unrecognized VPI/VCI values, and cells with invalid cell header patterns. If cells with undefined PTI values are discarded, they are also counted here.
In Hec Errors	Number of cells received with an ATM Cell Header HEC error
In Invalid Vpi Vci Errors	Number of cells received with an unregistered VCC address.
In Port Not Enable Errors	Number of cells received on a port that has not been enabled.
In PTI Errors	Number of cells received with an ATM header Payload Type Indicator (PTI) error
In Idle Cells	Number of idle cells received

Heading	Description
In Circuit Type Errors	Number of cells received with an illegal circuit type
In OAM RM CRC Errors	Number of OAM and RM cells received with CRC errors
In GFC Errors	Number of cells received with a non-zero GFC.

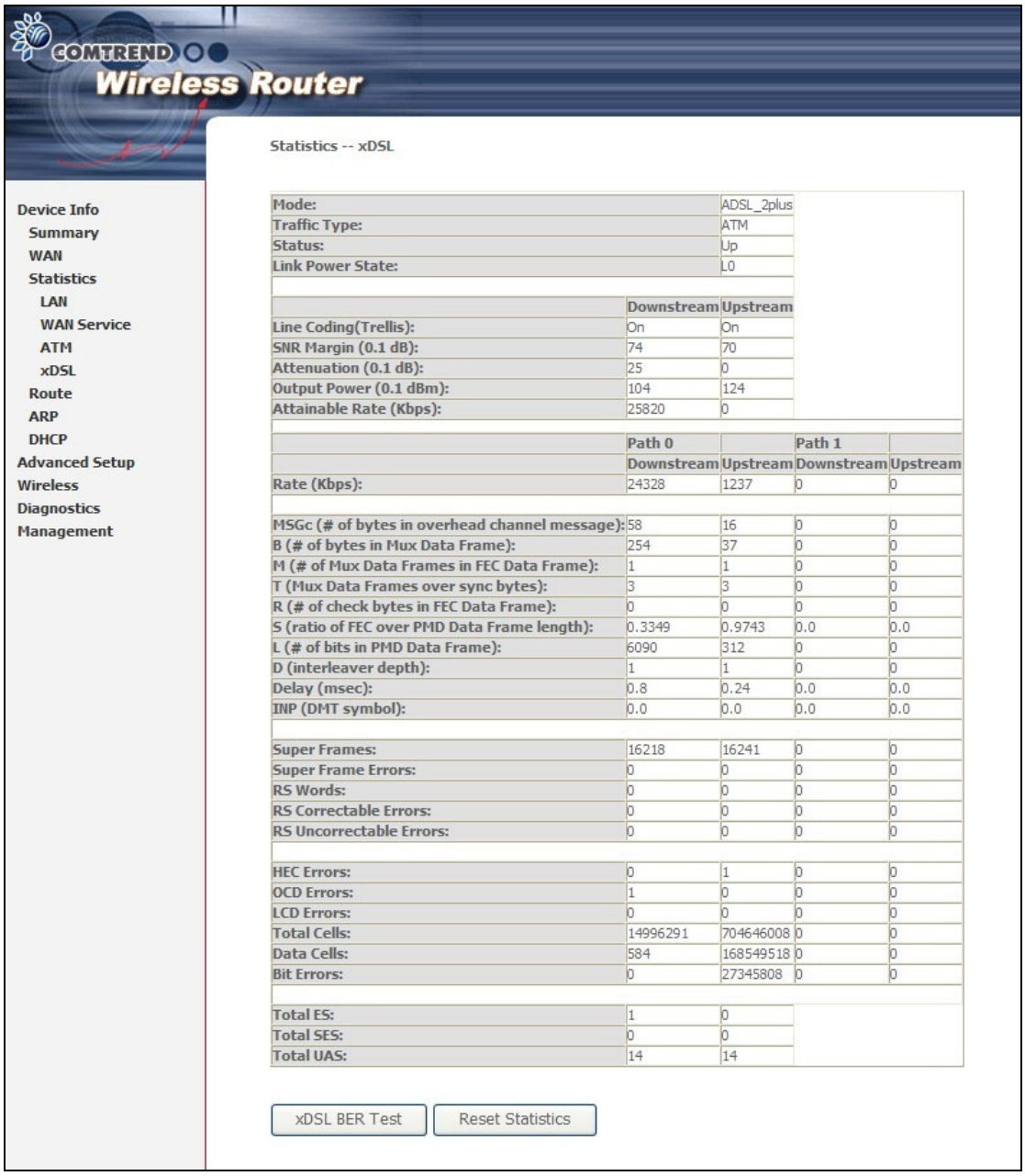
AAL5 Interface Statistics

Heading	Description
In Octets	Number of received AAL5/AAL0 CPCS PDU octets
Out Octets	Number of received AAL5/AAL0 CPCS PDU octets transmitted
In Ucast Pkts	Number of received AAL5/AAL0 CPCS PDUs passed to a higher-layer for transmission
Out Ucast Pkts	Number of received AAL5/AAL0 CPCS PDUs received from a higher layer for transmission
In Errors	Number of received AAL5/AAL0 CPCS PDUs received that contain an error. These errors include CRC-32 errors.
Out Errors	Number of received AAL5/AAL0 CPCS PDUs that could not be transmitted due to errors.
In Discards	Number of received AAL5/AAL0 CPCS PDUs discarded due to an input buffer overflow condition.
Out Discards	This field is not currently used

AAL5 VCC Statistics

Heading	Description
VPI/VCI	ATM Virtual Path/Channel Identifiers
CRC Errors	Number of PDUs received with CRC-32 errors
SAR TimeOuts	Number of partially re-assembled PDUs that were discarded because they were not fully re-assembled within the required period of time. If the re-assembly time is not supported, then this object contains a zero value.
Oversized SDUs	Number of PDUs discarded because the corresponding SDU was too large
Short Packet Errors	Number of PDUs discarded because the PDU length was less than the size of the AAL5 trailer
Length Errors	Number of PDUs discarded because the PDU length did not match the length in the AAL5 trailer

4.2.4 xDSL Statistics


COMTREND
Wireless Router
Device Info
Summary
WAN
Statistics
LAN
WAN Service
ATM
xDSL
Route
ARP
DHCP
Advanced Setup
Wireless
Diagnostics
Management
Statistics -- xDSL
Mode: ADSL_2plus
Traffic Type: ATM
Status: Up
Link Power State: L0
Downstream Upstream
Line Coding(Trellis): On On
SNR Margin (0.1 dB): 74 70
Attenuation (0.1 dB): 25 0
Output Power (0.1 dBm): 104 124
Attainable Rate (Kbps): 25820 0
Path 0 Path 1
Downstream Upstream Downstream Upstream
Rate (Kbps): 24328 1237 0 0
MSGc (# of bytes in overhead channel message): 58 16 0 0
B (# of bytes in Mux Data Frame): 254 37 0 0
M (# of Mux Data Frames in FEC Data Frame): 1 1 0 0
T (Mux Data Frames over sync bytes): 3 3 0 0
R (# of check bytes in FEC Data Frame): 0 0 0 0
S (ratio of FEC over PMD Data Frame length): 0.3349 0.9743 0.0 0.0
L (# of bits in PMD Data Frame): 6090 312 0 0
D (interleaver depth): 1 1 0 0
Delay (msec): 0.8 0.24 0.0 0.0
INP (DMT symbol): 0.0 0.0 0.0 0.0
Super Frames: 16218 16241 0 0
Super Frame Errors: 0 0 0 0
RS Words: 0 0 0 0
RS Correctable Errors: 0 0 0 0
RS Uncorrectable Errors: 0 0 0 0
HEC Errors: 0 1 0 0
OCD Errors: 1 0 0 0
LCD Errors: 0 0 0 0
Total Cells: 14996291 704646008 0 0
Data Cells: 584 168549518 0 0
Bit Errors: 0 27345808 0 0
Total ES: 1 0
Total SES: 0 0
Total UAS: 14 14
xDSL BER Test
Reset Statistics

Click the **Reset Statistics** button to refresh this screen.

Field	Description
Mode	G.Dmt, G.lite, T1.413, ADSL2, ADSL2+
Traffic Type	Channel type Interleave or Fast
Status	Lists the status of the DSL link
Link Power State	Link output power state.

Line Coding (Trellis)	Trellis On/Off
SNR Margin (0.1 dB)	Signal to Noise Ratio (SNR) margin
Attenuation (0.1 dB)	Estimate of average loop attenuation

	in the downstream direction.
Output Power (0.1 dBm)	Total upstream output power
Attainable Rate (Kbps)	The sync rate you would obtain.
Rate (Kbps)	Current sync rate.

In G.DMT mode, the following section is inserted.

K	Number of bytes in DMT frame
R	Number of check bytes in RS code word
S	RS code word size in DMT frame
D	The interleaver depth
Delay	The delay in milliseconds (msec)

In ADSL2+ mode, the following section is inserted.

MSGc	Number of bytes in overhead channel message
B	Number of bytes in Mux Data Frame
M	Number of Mux Data Frames in FEC Data Frame
T	Mux Data Frames over sync bytes
R	Number of check bytes in FEC Data Frame
S	Ratio of FEC over PMD Data Frame length
L	Number of bits in PMD Data Frame
D	Iinterleaver depth
Delay	The delay in milliseconds (msec)
INMP	DMT symbol

Super Frames	Total number of super frames
Super Frame Errors	Number of super frames received with errors
RS Words	Total number of Reed-Solomon code errors
RS Correctable Errors	Total Number of RS with correctable errors
RS Uncorrectable Errors	Total Number of RS words with uncorrectable errors

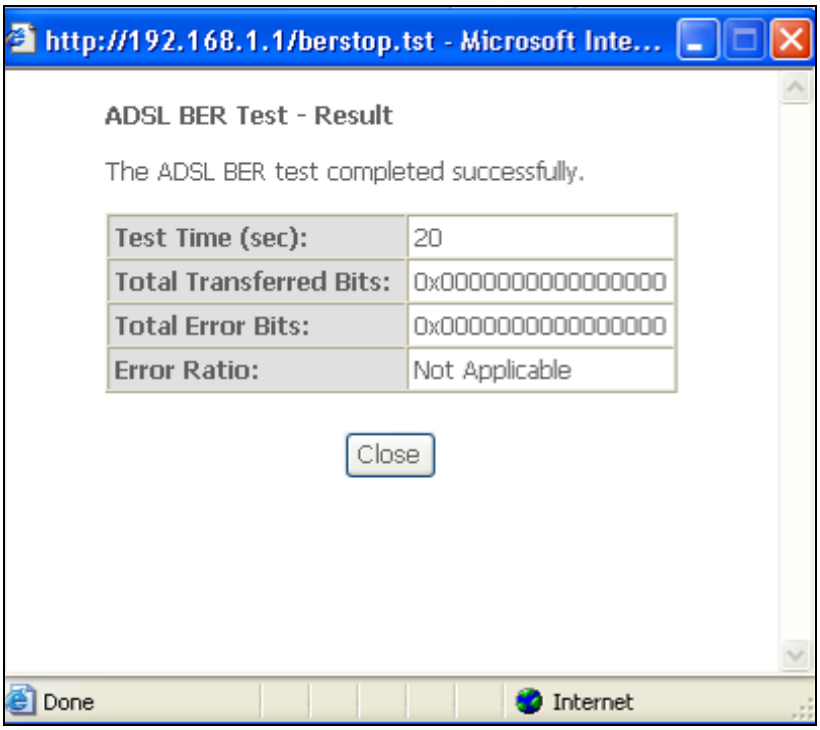
HEC Errors	Total Number of Header Error Checksum errors
OCD Errors	Total Number of Out-of-Cell Delineation errors
LCD Errors	Total number of Loss of Cell Delineation
Total Cells	Total number of ATM cells (including idle + data cells)
Data Cells	Total number of ATM data cells
Bit Errors	Total number of bit errors

Total ES	Total Number of Errored Seconds
Total SES	Total Number of Severely Errored Seconds
Total UAS	Total Number of Unavailable Seconds

Within the ADSL Statistics window, a Bit Error Rate (BER) test can be started using the **xDSL BER Test** button. A small window will open when the button is pressed; it will appear as shown below. Click **Start** to start the test or **Close**.

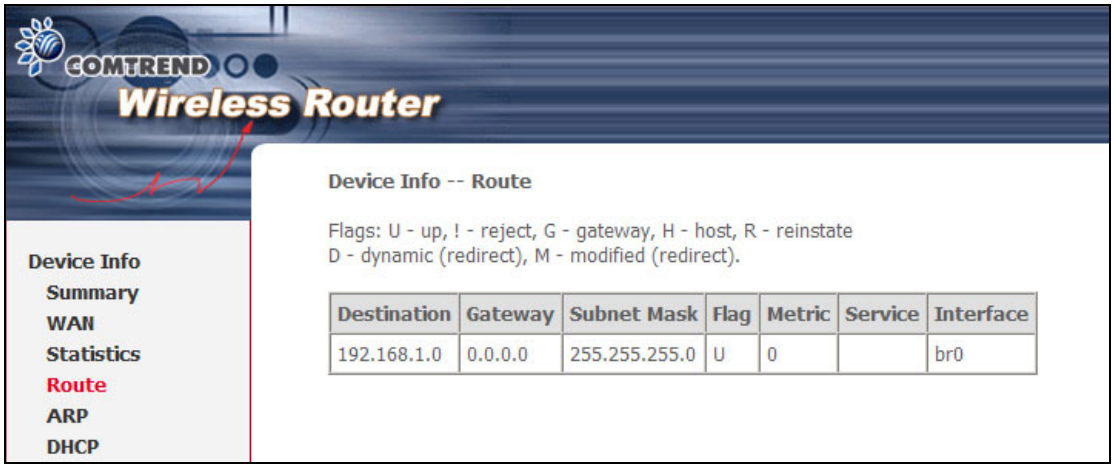
http://192.168.1.1/berstart.tst?berState=0 - M...
ADSL BER Test - Start
The ADSL Bit Error Rate (BER) test determines the quality of the ADSL connection. The test is done by transferring idle cells containing a known pattern and comparing the received data with this known pattern to check for any errors.
Select the test duration below and click "Start".
Tested Time (sec): 20
Start
Close
Done
Internet

If the test is successful, the pop-up window will display as follows.



4.3 Route

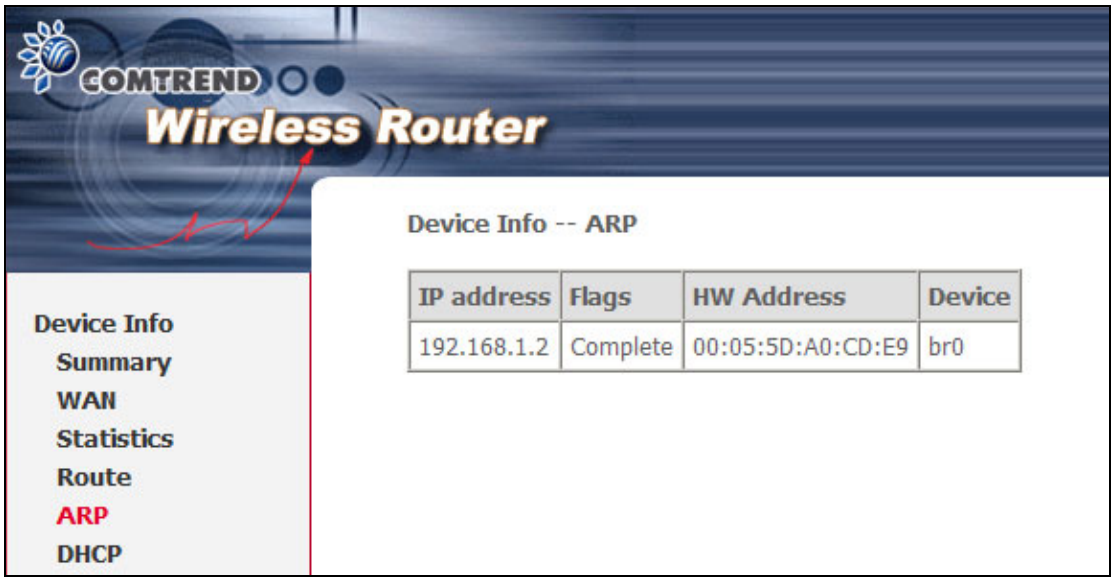
Choose **Route** to display the routes that the CT-5364A has found.



Field	Description
Destination	Destination network or destination host
Gateway	Next hub IP address
Subnet Mask	Subnet Mask of Destination
Flag	U: route is up !: reject route G: use gateway H: target is a host R: reinstate route for dynamic routing D: dynamically installed by daemon or redirect M: modified from routing daemon or redirect
Metric	The 'distance' to the target (usually counted in hops). It is not used by recent kernels, but may be needed by routing daemons.
Service	Shows the WAN connection label
Interface	Shows connection interfaces

4.4 ARP

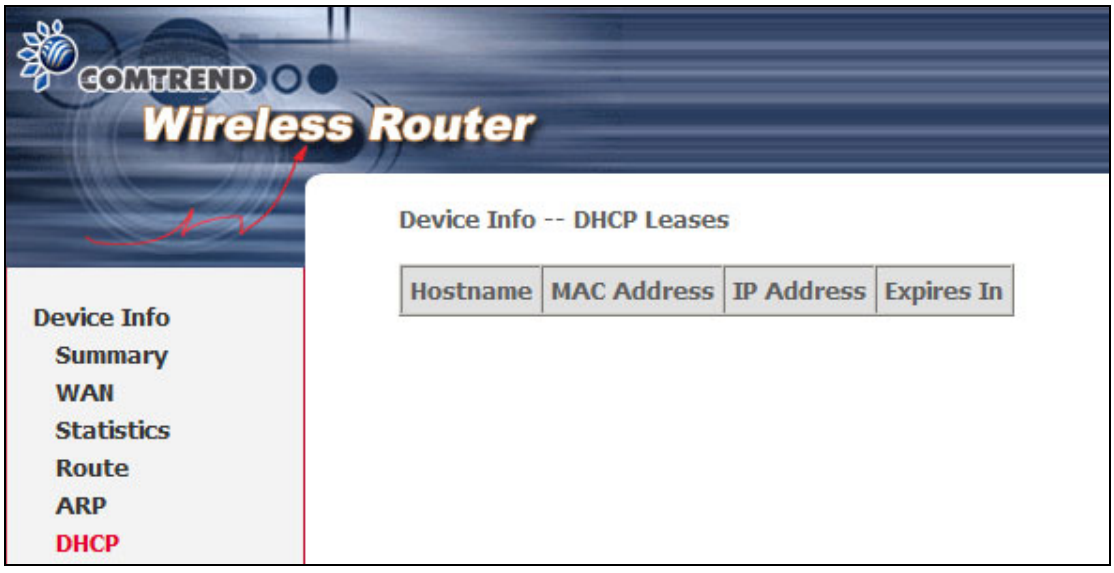
Click **ARP** to display the ARP information.



Field	Description
IP address	Shows IP address of host pc
Flags	Complete, Incomplete, Permanent, or Publish
HW Address	Shows the MAC address of host pc
Device	Shows the connection interface

4.5 DHCP

Click **DHCP** to display all DHCP Leases.



Field	Description
Hostname	Shows the device/host/PC network name
MAC Address	Shows the Ethernet MAC address of the device/host/PC
IP Address	Shows IP address of device/host/PC
Expires In	Shows how much time is left for each DHCP Lease

Chapter 5 Advanced Setup

This chapter explains the following screens:

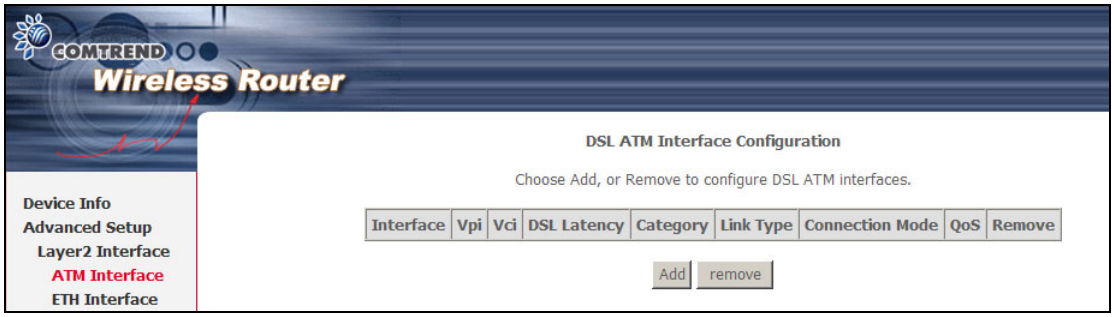
5.1 Layer 2 Interface	5.2 WAN
5.3 LAN	5.4 NAT
5.5 Security	5.6 Parental Control
5.7 Quality of Service (QoS)	5.8 Routing
5.9 DNS	5.10 DSL
5.11 UPnP	5.12 Print Server
5.13 Interface Grouping	5.14 LAN Ports
5.15 Certificate	

5.1 Layer 2 Interface

The ATM and ETH WAN Interface screens are described here. For detailed setup instructions, see Appendix H. 3G setup instructions are provided in Appendix G.

5.1.1 ATM Interface

Add or remove ATM interface connections here.



Click **Add** to create a new ATM interface (see Appendix H).

NOTE:	Up to 8 ATM interfaces can be created and saved in flash memory.

To remove a connection, select its Remove column radio button and click **remove**.

Heading	Description
Interface	WAN interface name.
VPI	ATM VPI (0-255)
VCI	ATM VCI (32-65535)
DSL Latency	{Path0} indicates that PVC portID = 0
Category	ATM service category
Link Type	Choose EoA (for PPPoE, IPoE, and Bridge), PPPoA, or IPoA.
Connection Mode	Default Mode – Single service over one interface. Vlan Mux Mode – Multiple Vlan services over one interface. MSC Mode – Multiple Services over one interface.
QoS	Quality of Service (QoS) status
Remove	Select items for removal

5.1.2 ETH (WAN) Interface

This screen displays the Ethernet WAN Interface configuration.

Click **Add** to create a new connection (see Appendix H).

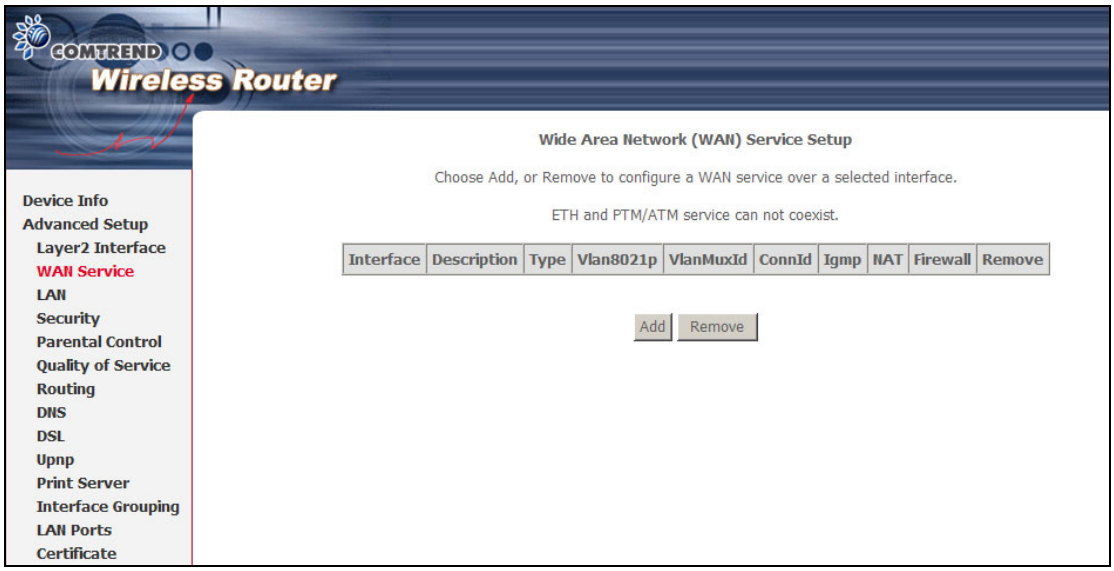
NOTE: One Ethernet WAN interface can be created and saved in flash memory.

To remove a connection, select its Remove column radio button and click **remove.**

Heading	Description
Interface/(Name)	Ethernet WAN Interface.
Connection Mode	Default Mode – Single service over one interface. Vlan Mux Mode – Multiple Vlan services over one interface. MSC Mode – Multiple Services over one interface.
Remove	Select items for removal

5.2 WAN

This screen allows for the configuration of WAN interfaces.



Click the **Add** button to create a new connection. For connections on ATM or ETH WAN interfaces see Appendix H. 3G setup instructions are provided in Appendix G.

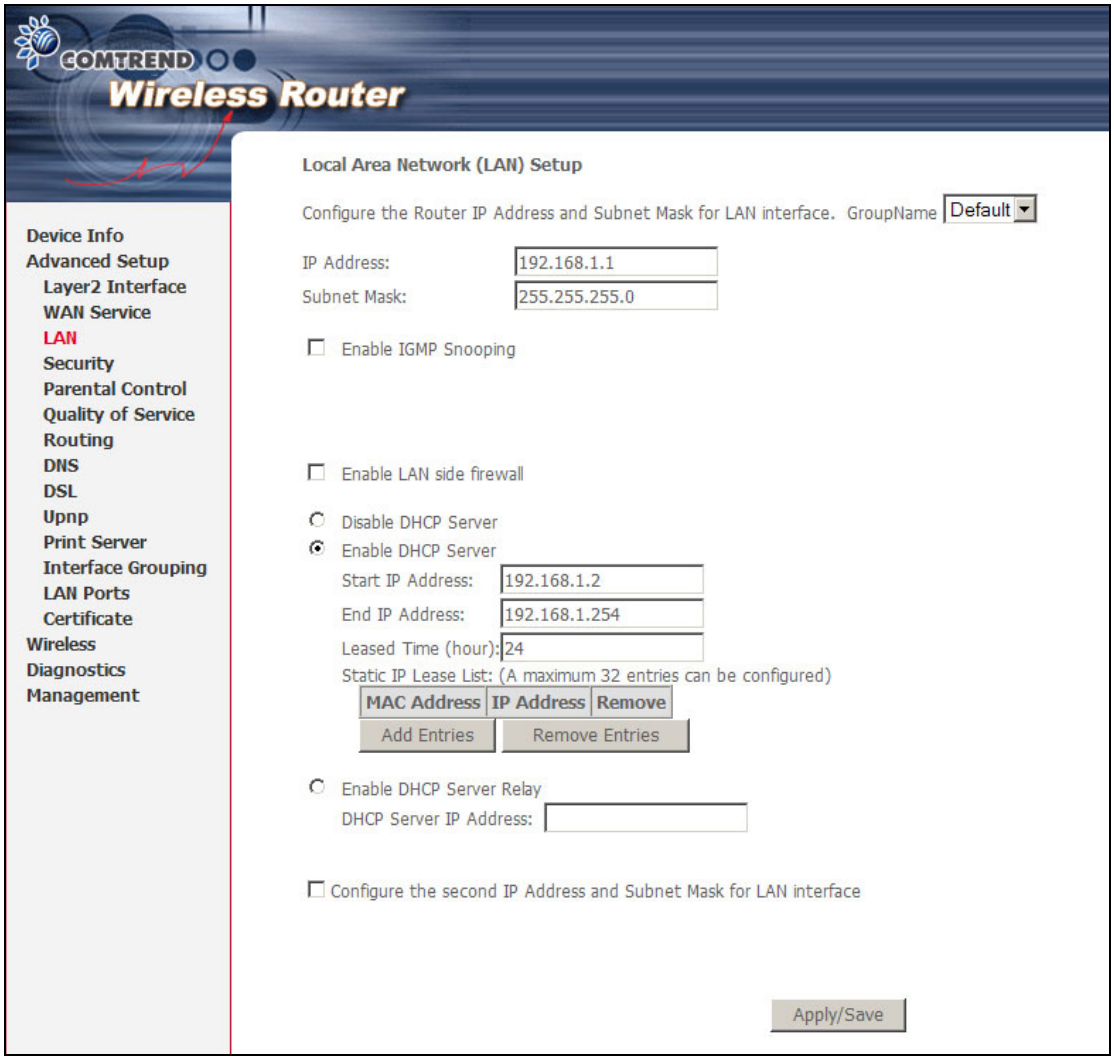
NOTE:	ETH and ATM service connections cannot coexist. In Default Mode, up to 8 WAN connections can be configured; while VLAN Mux and MSC Connection Modes support up to 16 WAN connections.

To remove a connection, select its Remove column radio button and click **Remove.**

Heading	Description
Interface	Name of the interface for WAN
Description	Name of the WAN connection
Type	Shows the connection type
Vlan8021p	VLAN ID used for VLAN Tagging (IEEE 802.1p)
VlanMuxId	Shows 802.1Q VLAN ID
ConnId	WAN connection ID number
IGMP	Shows Internet Group Management Protocol (IGMP) status
NAT	Shows Network Address Translation (NAT) status
Firewall	Shows the status of Firewall
Remove	Select items for removal

5.3 LAN

Configure local area network (LAN) settings here.



Consult the field descriptions below for more details.

GroupName: Select an Interface Group.

1st LAN INTERFACE

IP Address: Enter the IP address for the LAN port.

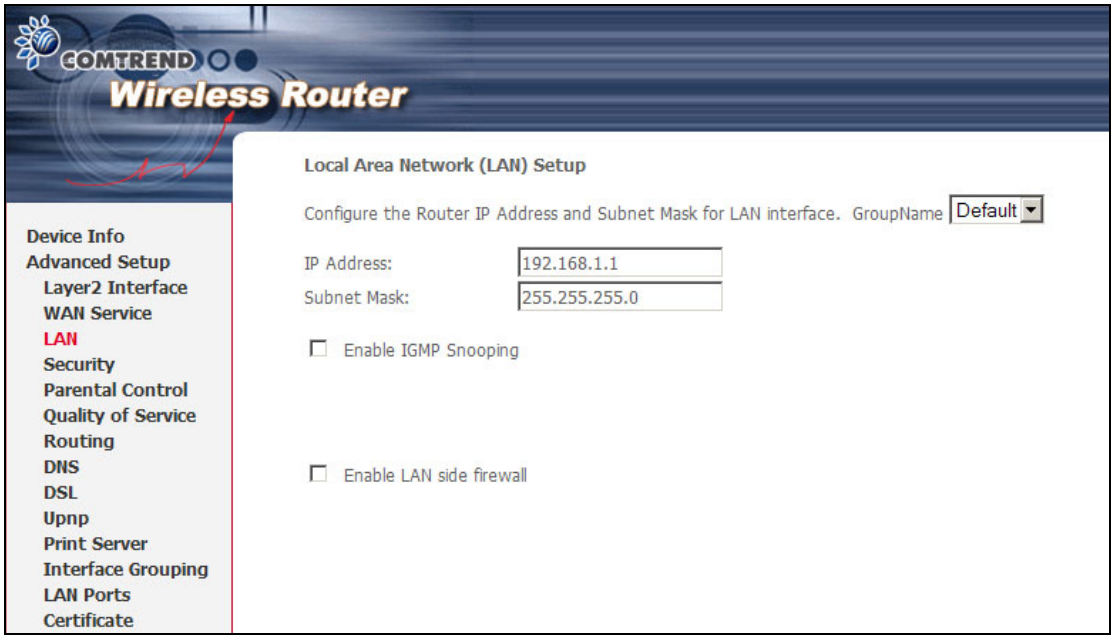
Subnet Mask: Enter the subnet mask for the LAN port.

Enable IGMP Snooping: Enable by ticking the checkbox ☑.

Standard Mode: In standard mode, multicast traffic will flood to all bridge ports when no client subscribes to a multicast group – even if IGMP snooping is enabled.

Blocking Mode: In blocking mode, the multicast data traffic will be blocked and not flood to all bridge ports when there are no client subscriptions to any multicast group.

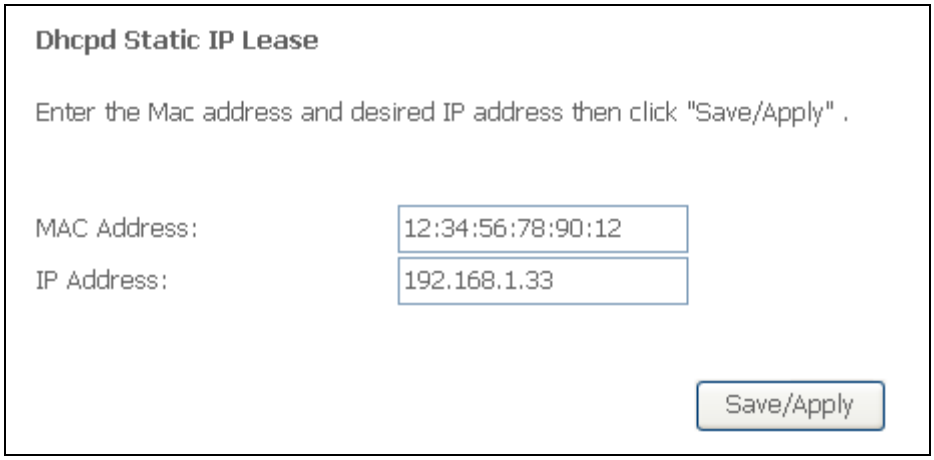
Enable LAN side firewall: Enable by ticking the checkbox ☑.



DHCP Server: To enable DHCP, select **Enable DHCP server** and enter Start and End IP addresses and the Leased Time. This setting configures the router to automatically assign IP, default gateway and DNS server addresses to every PC on your LAN.

Static IP Lease List: A maximum 32 entries can be configured.

To add an entry, enter MAC address and Static IP and then click **Save/Apply**.

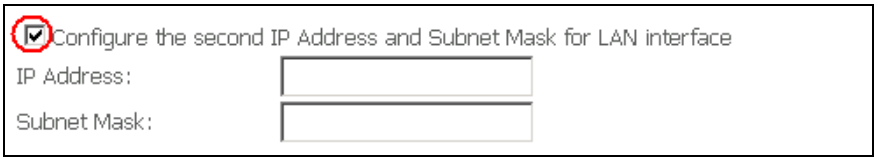


To remove an entry, tick the corresponding checkbox ☑ in the Remove column and then click the **Remove Entries** button, as shown below.

DHCP Server Relay: Enable with checkbox ☑ and enter DHCP Server IP address. This allows the Router to relay the DHCP packets to the remote DHCP server. The remote DHCP server will provide the IP address. *This option is hidden if NAT is enabled or when the router is configured with only one Bridge PVC.*

2ND LAN INTERFACE

To configure a secondary IP address, tick the checkbox ☑ outlined (in RED) below.



IP Address: Enter the secondary IP address for the LAN port.

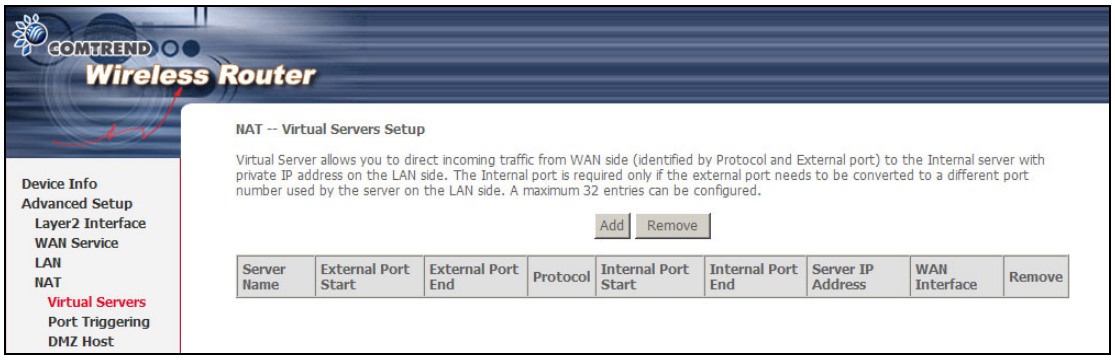
Subnet Mask: Enter the secondary subnet mask for the LAN port.

5.4 NAT

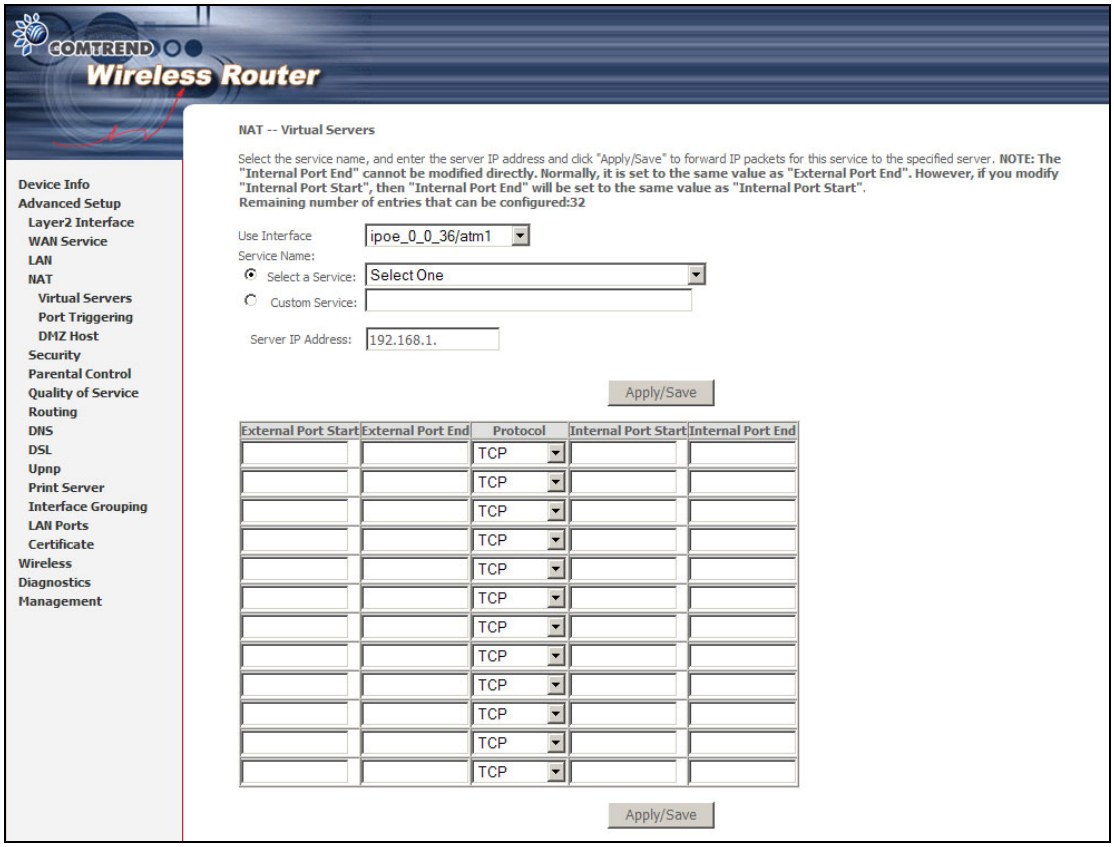
To display this option, NAT must be enabled in at least one PVC shown on the Advanced Setup - WAN screen. (*NAT is not an available option in Bridge mode*)

5.4.1 Virtual Servers

Virtual Servers allow you to direct incoming traffic from the WAN side (identified by Protocol and External port) to the Internal server with private IP addresses on the LAN side. The Internal port is required only if the external port needs to be converted to a different port number used by the server on the LAN side.
A maximum of 32 entries can be configured.


COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
WAN Service
LAN
NAT
Virtual Servers
Port Triggering
DMZ Host
NAT -- Virtual Servers Setup
Virtual Server allows you to direct incoming traffic from WAN side (identified by Protocol and External port) to the Internal server with private IP address on the LAN side. The Internal port is required only if the external port needs to be converted to a different port number used by the server on the LAN side. A maximum 32 entries can be configured.
Add
Remove
Server Name
External Port Start
External Port End
Protocol
Internal Port Start
Internal Port End
Server IP Address
WAN Interface
Remove

To add a Virtual Server, click **Add**. The following will be displayed.

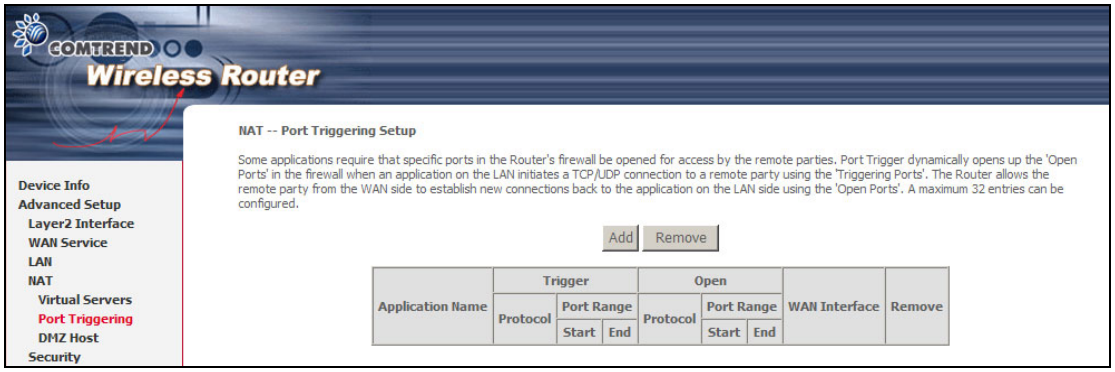


Consult the table below for field and header descriptions.

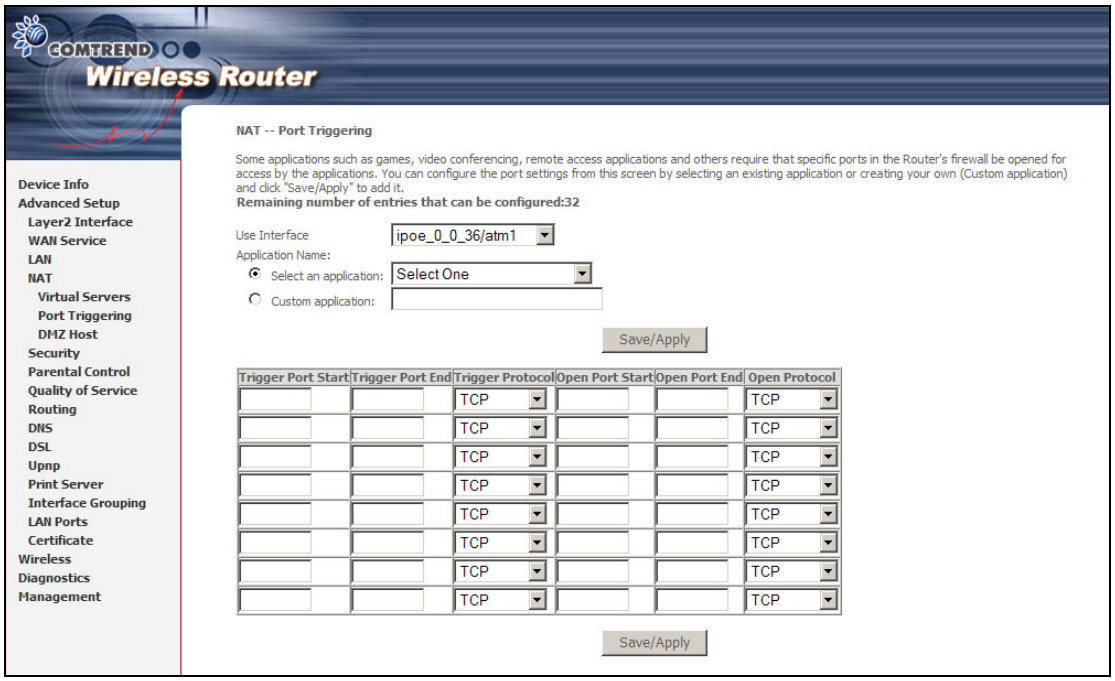
Field/Header	Description
Use Interface	Select the WAN interface from the drop-down box.
Select a Service **Or** Custom Server	User should select the service from the list. **Or** User can enter the name of their choice.
Server IP Address	Enter the IP address for the server.
External Port Start	Enter the starting external port number (when you select Custom Server). When a service is selected, the port ranges are automatically configured.
External Port End	Enter the ending external port number (when you select Custom Server). When a service is selected, the port ranges are automatically configured.
Protocol	TCP, TCP/UDP, or UDP.
Internal Port Start	Enter the internal port starting number (when you select Custom Server). When a service is selected the port ranges are automatically configured
Internal Port End	Enter the internal port ending number (when you select Custom Server). When a service is selected, the port ranges are automatically configured.

5.4.2 Port Triggering

Some applications require that specific ports in the firewall be opened for access by the remote parties. Port Triggers dynamically 'Open Ports' in the firewall when an application on the LAN initiates a TCP/UDP connection to a remote party using the 'Triggering Ports'. The Router allows the remote party from the WAN side to establish new connections back to the application on the LAN side using the 'Open Ports'. A maximum 32 entries can be configured.


COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
WAN Service
LAN
NAT
Virtual Servers
Port Triggering
DMZ Host
Security
NAT -- Port Triggering Setup
Some applications require that specific ports in the Router's firewall be opened for access by the remote parties. Port Trigger dynamically opens up the 'Open Ports' in the firewall when an application on the LAN initiates a TCP/UDP connection to a remote party using the 'Triggering Ports'. The Router allows the remote party from the WAN side to establish new connections back to the application on the LAN side using the 'Open Ports'. A maximum 32 entries can be configured.
Add
Remove
Application Name
Trigger
Protocol
Port Range
Start
End
Open
Protocol
Port Range
Start
End
WAN Interface
Remove

To add a Trigger Port, click **Add**. The following will be displayed.



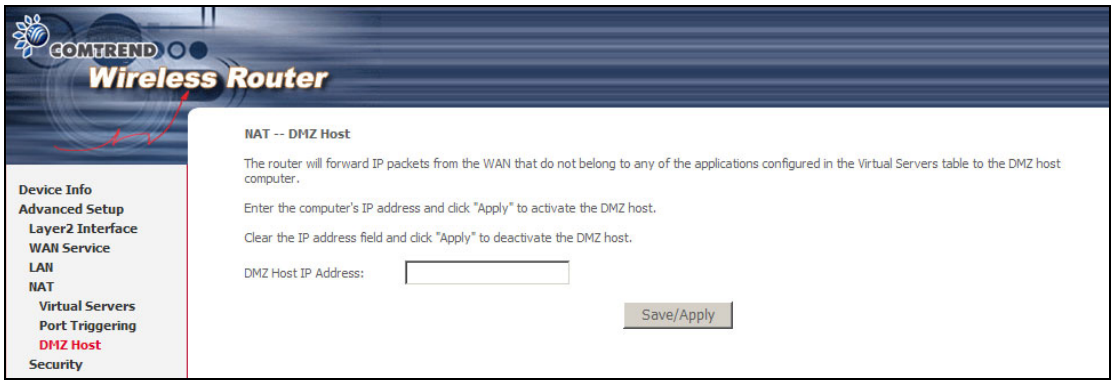
Consult the table below for field and header descriptions.

Field/Header	Description
Use Interface	Select the WAN interface from the drop-down box.
Select an Application **Or** Custom Application	User should select the application from the list. **Or** User can enter the name of their choice.
Trigger Port Start	Enter the starting trigger port number (when you select custom application). When an application is selected, the port ranges are automatically configured.

Field/Header	Description
Trigger Port End	Enter the ending trigger port number (when you select custom application). When an application is selected, the port ranges are automatically configured.
Trigger Protocol	TCP, TCP/UDP, or UDP.
Open Port Start	Enter the starting open port number (when you select custom application). When an application is selected, the port ranges are automatically configured.
Open Port End	Enter the ending open port number (when you select custom application). When an application is selected, the port ranges are automatically configured.
Open Protocol	TCP, TCP/UDP, or UDP.

5.4.3 DMZ Host

The DSL router will forward IP packets from the WAN that do not belong to any of the applications configured in the Virtual Servers table to the DMZ host computer.


COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
WAN Service
LAN
NAT
Virtual Servers
Port Triggering
DMZ Host
Security
NAT -- DMZ Host
The router will forward IP packets from the WAN that do not belong to any of the applications configured in the Virtual Servers table to the DMZ host computer.
Enter the computer's IP address and click "Apply" to activate the DMZ host.
Clear the IP address field and click "Apply" to deactivate the DMZ host.
DMZ Host IP Address:
Save/Apply

To **Activate** the DMZ host, enter the DMZ host IP address and click **Save/Apply**.

To **Deactivate** the DMZ host, clear the IP address field and click **Save/Apply**.

5.5 Security

To display this function, you must enable the firewall feature in WAN Setup.
For detailed descriptions, with examples, please consult Appendix A - Firewall.

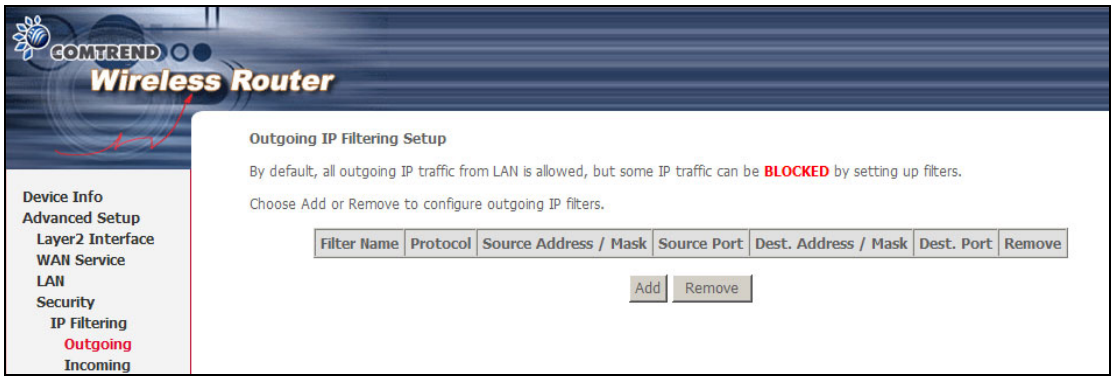
5.5.1 IP Filtering

This screen sets filter rules that limit IP traffic (Outgoing/Incoming). Multiple filter rules can be set and each applies at least one limiting condition. For individual IP packets to pass the filter all conditions must be fulfilled.

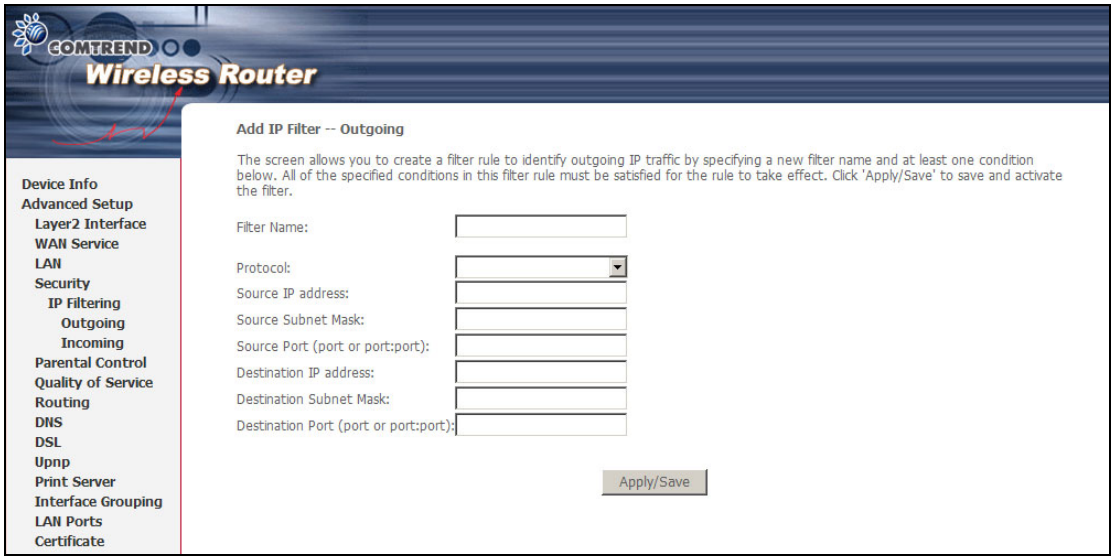
NOTE:	This function is not available when in bridge mode. Instead, MAC Filtering (pg. 36) performs a similar function.

OUTGOING IP FILTER

By default, all outgoing IP traffic is allowed, but IP traffic can be blocked with filters.



To add a filter (to block some outgoing IP traffic), click the **Add** button.
On the following screen, enter your filter criteria and then click **Apply/Save**.

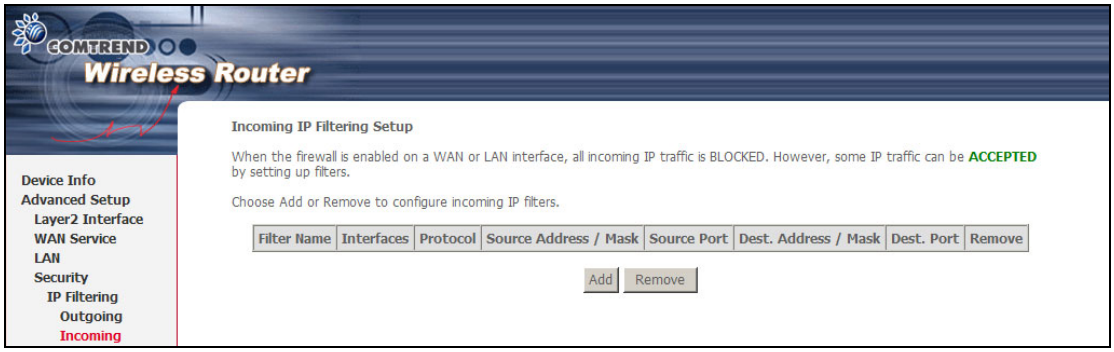


Consult the table below for field descriptions.

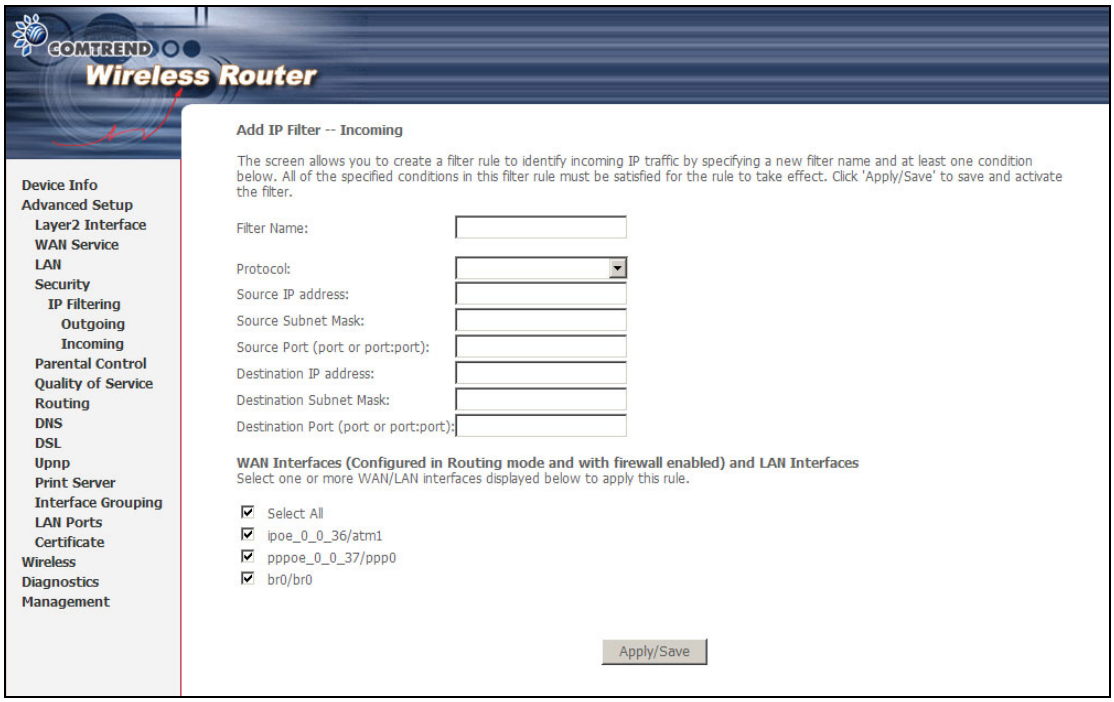
Field	Description
Filter Name	The filter rule label
Protocol	TCP, TCP/UDP, UDP, or ICMP.
Source IP address	Enter source IP address.
Source Subnet Mask	Enter source subnet mask.
Source Port (port or port:port)	Enter source port number or range.
Destination IP address	Enter destination IP address.
Destination Subnet Mask	Enter destination subnet mask.
Destination Port (port or port:port)	Enter destination port number or range.

INCOMING IP FILTER

By default, all incoming IP traffic is blocked, but IP traffic can be allowed with filters.



To add a filter (to allow incoming IP traffic), click the **Add** button.
On the following screen, enter your filter criteria and then click **Apply/Save**.



Consult the table below for field descriptions.

Field	**Description**
Filter Name	The filter rule label
Protocol	TCP, TCP/UDP, UDP, or ICMP.
Source IP address	Enter source IP address.
Source Subnet Mask	Enter source subnet mask.
Source Port (port or port:port)	Enter source port number or range.
Destination IP address	Enter destination IP address.
Destination Subnet Mask	Enter destination subnet mask.
Destination Port (port or port:port)	Enter destination port number or range.

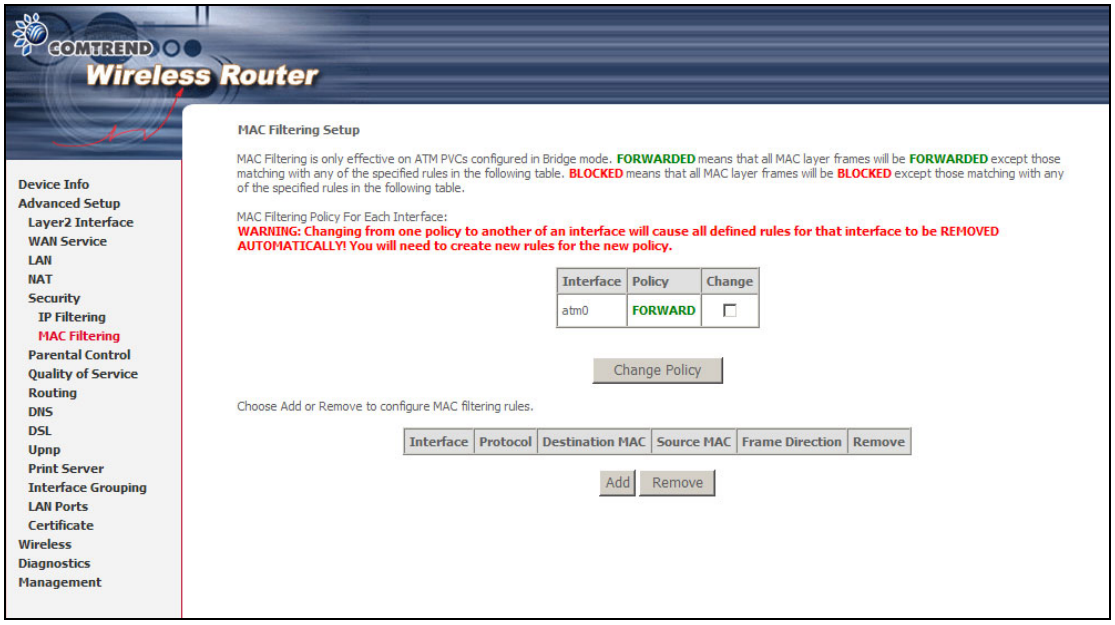
At the bottom of this screen, select the WAN and LAN Interfaces to which the filter rule will apply. You may select all or just a subset. WAN interfaces in bridge mode or without firewall enabled are not available.

5.5.2 MAC Filtering

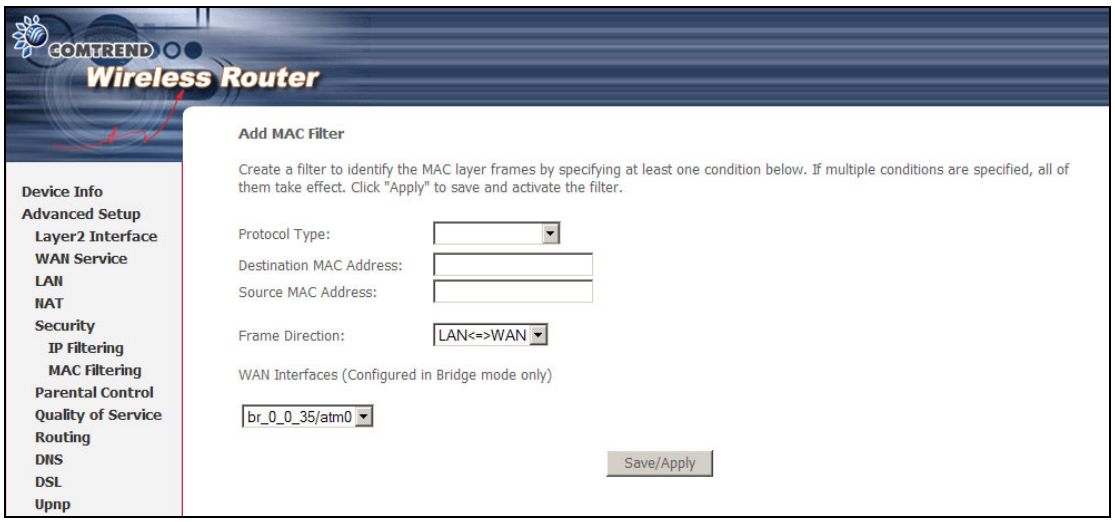
NOTE:	This option is only available in bridge mode. Other modes use IP Filtering (pg. 33) to perform a similar function.

Each network device has a unique 48-bit MAC address. This can be used to filter (block or forward) packets based on the originating device. MAC filtering policy and rules for the CT-5364A can be set according to the following procedure.

The MAC Filtering Global Policy is defined as follows. **FORWARDED** means that all MAC layer frames will be **FORWARDED** except those matching the MAC filter rules. **BLOCKED** means that all MAC layer frames will be **BLOCKED** except those matching the MAC filter rules. The default MAC Filtering Global policy is **FORWARDED**. It can be changed by clicking the **Change Policy** button.



Choose **Add** or **Remove** to configure MAC filtering rules. The following screen will appear when you click **Add**. Create a filter to identify the MAC layer frames by specifying at least one condition below. If multiple conditions are specified, all of them must be met. Click **Save/Apply** to save and activate the filter rule.



Consult the table below for detailed field descriptions.

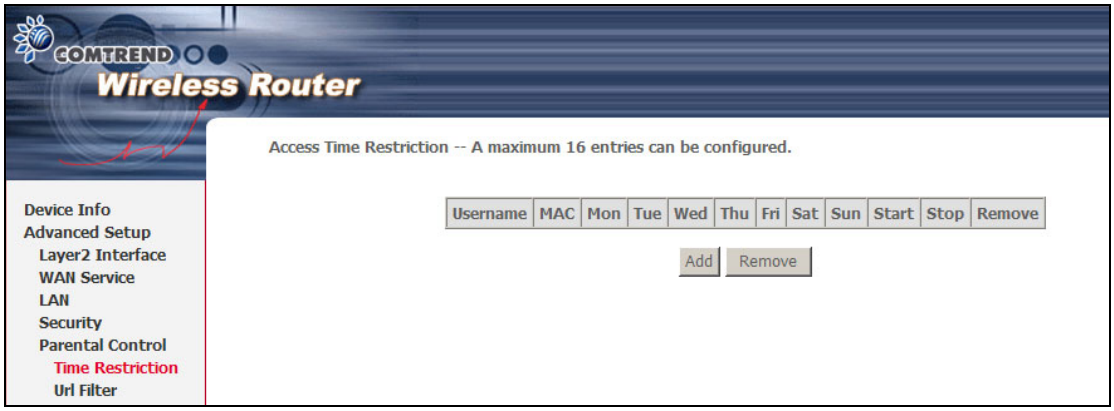
Field	Description
Protocol Type	PPPoE, IPv4, IPv6, AppleTalk, IPX, NetBEUI, IGMP
Destination MAC Address	Defines the destination MAC address
Source MAC Address	Defines the source MAC address
Frame Direction	Select the incoming/outgoing packet interface
WAN Interfaces	Applies the filter to selected WAN interfaces in bridge mode. These rules are arranged according to these interfaces, as shown under the **Interface** heading on the previous screen.

5.6 Parental Control

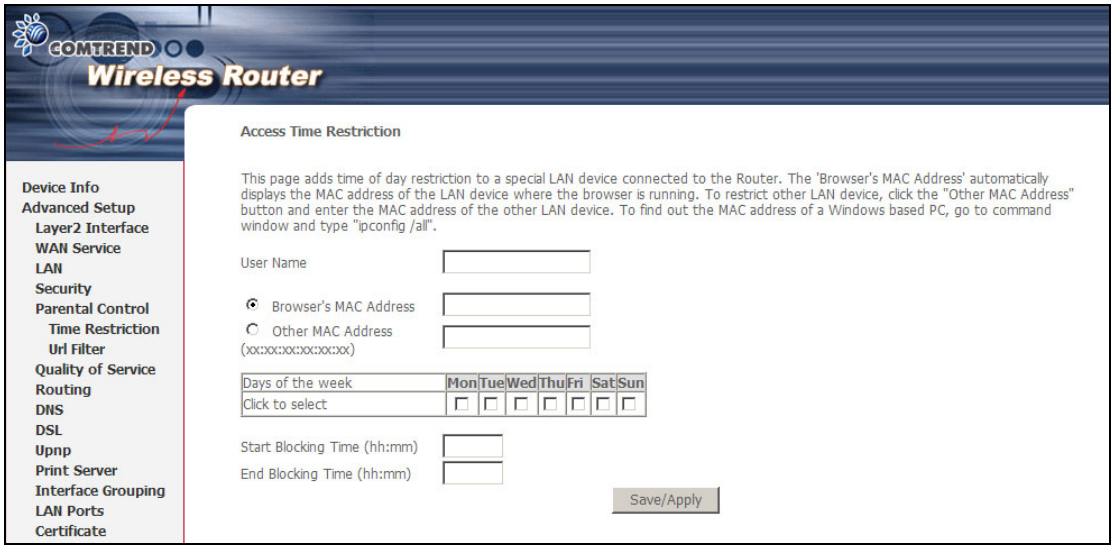
This selection provides WAN access control functionality.

5.6.1 Time Restriction

This feature restricts access from a LAN device to an outside network through the device on selected days at certain times. Make sure to activate the Internet Time server synchronization as described in section 8.4, so that the scheduled times match your local time.



Click **Add** to display the following screen.


COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
WAN Service
LAN
Security
Parental Control
Time Restriction
Url Filter
Quality of Service
Routing
DNS
DSL
Upnp
Print Server
Interface Grouping
LAN Ports
Certificate
Access Time Restriction
This page adds time of day restriction to a special LAN device connected to the Router. The 'Browser's MAC Address' automatically displays the MAC address of the LAN device where the browser is running. To restrict other LAN device, click the "Other MAC Address" button and enter the MAC address of the other LAN device. To find out the MAC address of a Windows based PC, go to command window and type "ipconfig /all".
User Name
Browser's MAC Address
Other MAC Address
(xx:xx:xx:xx:xx:xx)
Days of the week
Mon Tue Wed Thu Fri Sat Sun
Click to select
Start Blocking Time (hh:mm)
End Blocking Time (hh:mm)
Save/Apply

See below for field descriptions. Click **Save/Apply** to add a time restriction.

User Name: A user-defined label for this restriction.

Browser's MAC Address: MAC address of the PC running the browser.

Other MAC Address: MAC address of another LAN device.

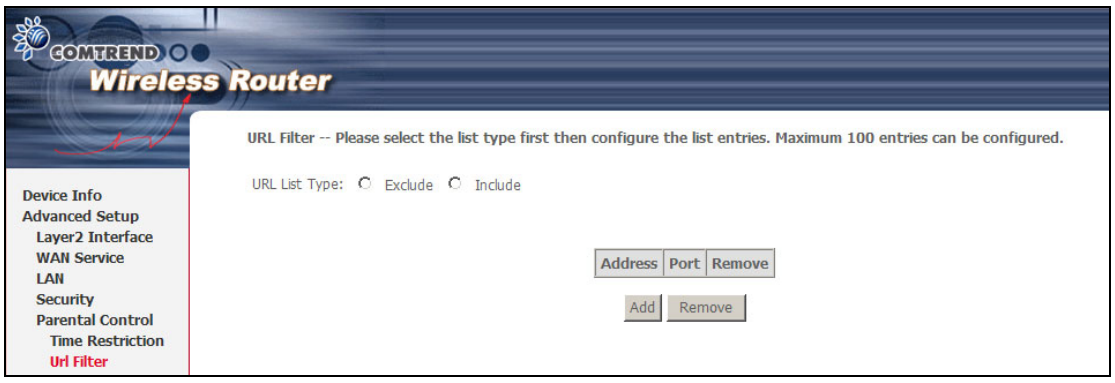
Days of the Week: The days the restrictions apply.

Start Blocking Time: The time the restrictions start.

End Blocking Time: The time the restrictions end.

5.6.2 URL Filter

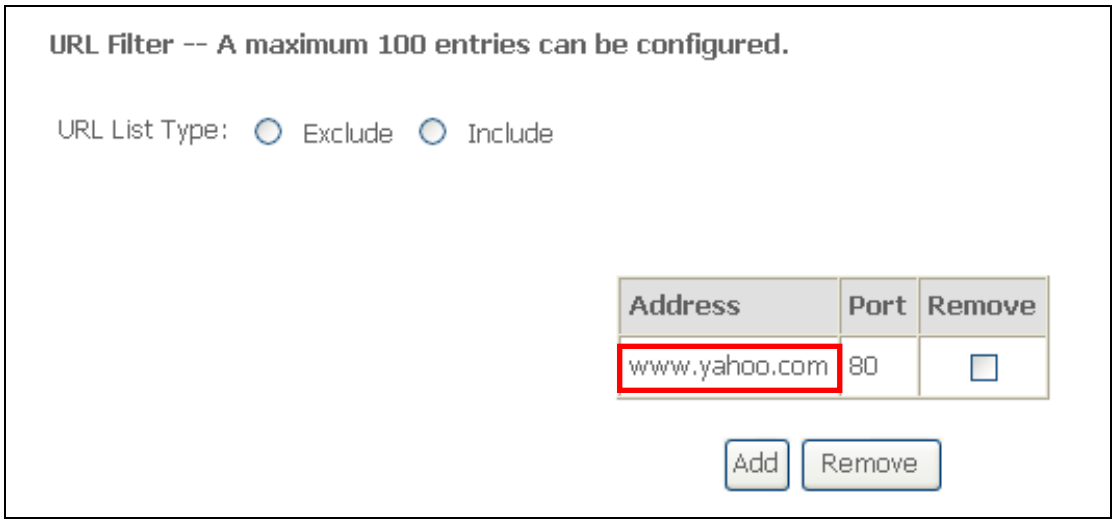
This screen allows for the creation of a filter rule for access rights to websites based on their URL address and port number.



Click **Add** to display the following screen.

Parental Control -- URL Filter Add
Enter the URL address and port number then click "Save/Apply" to add the entry to the URL filter.
URL Address:
www.yahoo.com
Port Number:
80
(Default 80 will be applied if leave blank.)
Save/Apply

Enter the URL address and port number then click **Save/Apply** to add the entry to the URL filter. URL Addresses begin with "www", as shown in this example.



A maximum of 100 entries can be added to the URL Filter list.
Tick the **Exclude** radio button to deny access to the websites listed.
Tick the **Include** radio button to restrict access to only those listed websites.

5.7 Quality of Service (QoS)

NOTE:	QoS must be enabled in at least one PVC to display this option. (see see Appendix H for detailed PVC setup instructions).

5.7.1 Queue Management Configuration

To Enable QoS tick the checkbox ☑ and select a Default DSCP Mark.

Click **Save/Apply** to activate QoS.

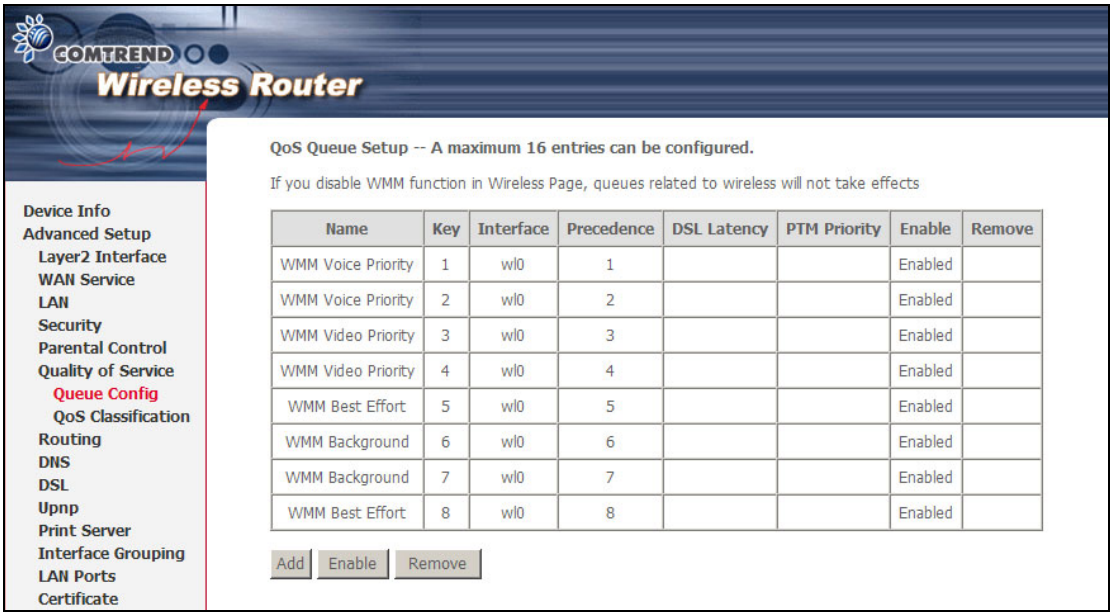
QoS and **DSCP Mark** are defined as follows:

Quality of Service (QoS): This provides different priority to different users or data flows, or guarantees a certain level of performance to a data flow in accordance with requests from Queue Prioritization.

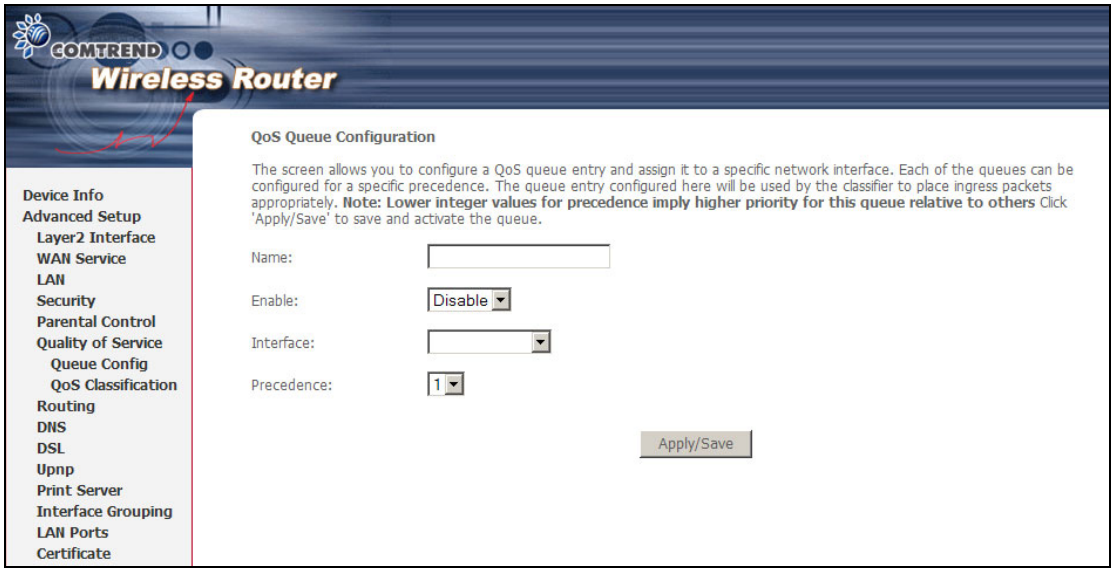
Default Differentiated Services Code Point (DSCP) Mark: This specifies the per hop behavior for a given flow of packets in the Internet Protocol (IP) header that do not match any other QoS rule.

5.7.2 Queue Configuration

This function follows the Differentiated Services rule of IP QoS. You can create a new Queue entry by clicking the **Add** button. Enable and assign an interface and precedence on the next screen. Click **Save/Reboot** on this screen to activate it.


COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
WAN Service
LAN
Security
Parental Control
Quality of Service
Queue Config
QoS Classification
Routing
DNS
DSL
Upnp
Print Server
Interface Grouping
LAN Ports
Certificate
QoS Queue Setup -- A maximum 16 entries can be configured.
If you disable WMM function in Wireless Page, queues related to wireless will not take effects
Name | Key | Interface | Precedence | DSL Latency | PTM Priority | Enable | Remove
WMM Voice Priority | 1 | wl0 | 1 | | | Enabled |
WMM Voice Priority | 2 | wl0 | 2 | | | Enabled |
WMM Video Priority | 3 | wl0 | 3 | | | Enabled |
WMM Video Priority | 4 | wl0 | 4 | | | Enabled |
WMM Best Effort | 5 | wl0 | 5 | | | Enabled |
WMM Background | 6 | wl0 | 6 | | | Enabled |
WMM Background | 7 | wl0 | 7 | | | Enabled |
WMM Best Effort | 8 | wl0 | 8 | | | Enabled |
Add
Enable
Remove

Click **Add** to display the following screen.



Name: Identifier for this Queue entry.

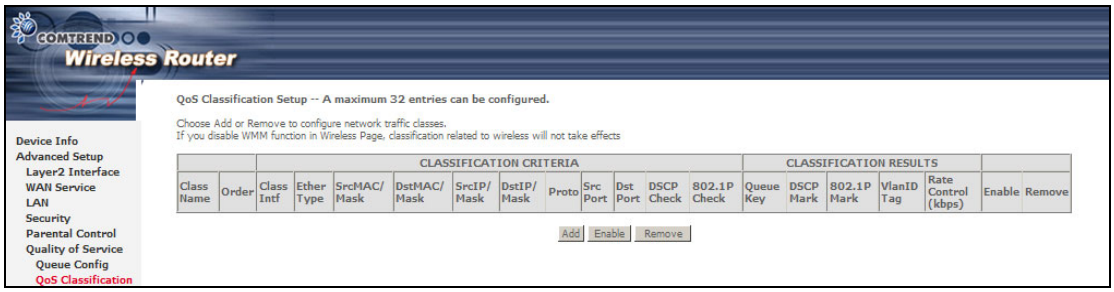
Enable: Enable/Disable the Queue entry.

Interface: Assign the entry to a specific network interface (QoS enabled).

Precedence: Configure precedence for the Queue entry. Lower integer values for precedence imply higher priority for this entry relative to others.

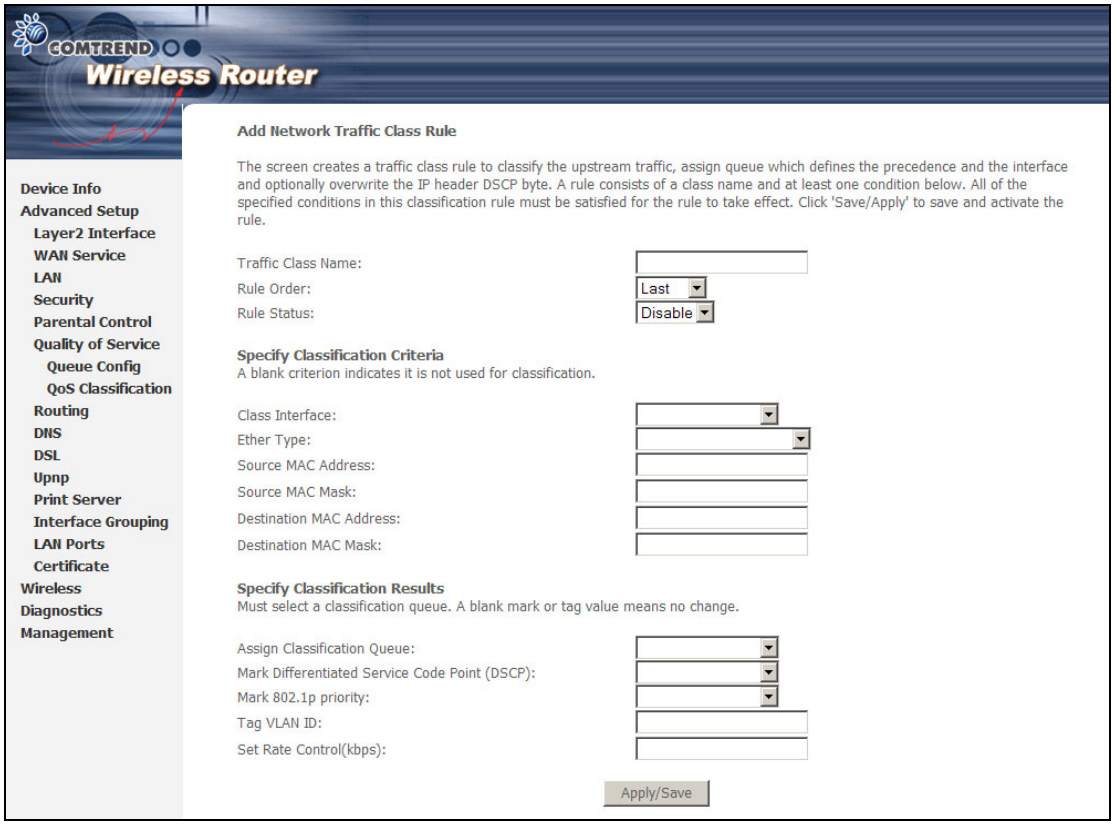
5.7.3 QoS Classification

The network traffic classes are listed in the following table.



Click **Add** to configure a network traffic class rule and **Enable** to activate it. To delete an entry from the list, click **Remove**.

This screen creates a traffic class rule to classify the upstream traffic, assign queuing priority and optionally overwrite the IP header DSCP byte. A rule consists of a class name and at least one logical condition. All the conditions specified in the rule must be satisfied for it to take effect.


COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
WAN Service
LAN
Security
Parental Control
Quality of Service
Queue Config
QoS Classification
Routing
DNS
DSL
Upnp
Print Server
Interface Grouping
LAN Ports
Certificate
Wireless
Diagnostics
Management
Add Network Traffic Class Rule
The screen creates a traffic class rule to classify the upstream traffic, assign queue which defines the precedence and the interface and optionally overwrite the IP header DSCP byte. A rule consists of a class name and at least one condition below. All of the specified conditions in this classification rule must be satisfied for the rule to take effect. Click 'Save/Apply' to save and activate the rule.
Traffic Class Name:
Rule Order:
Last
Rule Status:
Disable
Specify Classification Criteria
A blank criterion indicates it is not used for classification.
Class Interface:
Ether Type:
Source MAC Address:
Source MAC Mask:
Destination MAC Address:
Destination MAC Mask:
Specify Classification Results
Must select a classification queue. A blank mark or tag value means no change.
Assign Classification Queue:
Mark Differentiated Service Code Point (DSCP):
Mark 802.1p priority:
Tag VLAN ID:
Set Rate Control(kbps):
Apply/Save

Field	Description
Traffic Class Name	Enter a name for the traffic class.
Rule Order	Last or null are the only options.
Rule Status	Disable or enable the rule.
Classification Criteria	
Class Interface	Select an interface (i.e. Local, eth0/1, usb0, wl0)
Ether Type	Set the Ethernet type (e.g. IP, ARP, IPv6).
Source MAC Address	A packet belongs to SET-1, if a binary-AND of its source MAC address with the Source MAC Mask is equal to the binary-AND of the Source MAC Mask and this field.
Source MAC Mask	This is the mask used to decide how many bits are checked in Source MAC Address.
Destination MAC Address	A packet belongs to SET-1 then the result that the Destination MAC Address of its header binary-AND to the Destination MAC Mask must equal to the result that this field binary-AND to the Destination MAC Mask.
Destination MAC Mask	This is the mask used to decide how many bits are checked in Destination MAC Address.
Classification Results	
Assign Classification Queue	The queue configurations are presented in this format: "Interfacename&Prece P&Queue Q" where P and Q are the Precedence and Queue Key values for the corresponding Interface as listed on the Queue Config screen.

Field	Description
Mark Differentiated Services Code Point (DSCP)	The selected Code Point gives the corresponding priority to packets that satisfy the rule.
Mark 802.1p Priority	Select between 0-7. Lower values have higher priority.
Tag VLAN ID	Enter a 802.1Q VLAN ID tag [2-4094]
Set Rate Control	The data transmission rate limit in kbps.

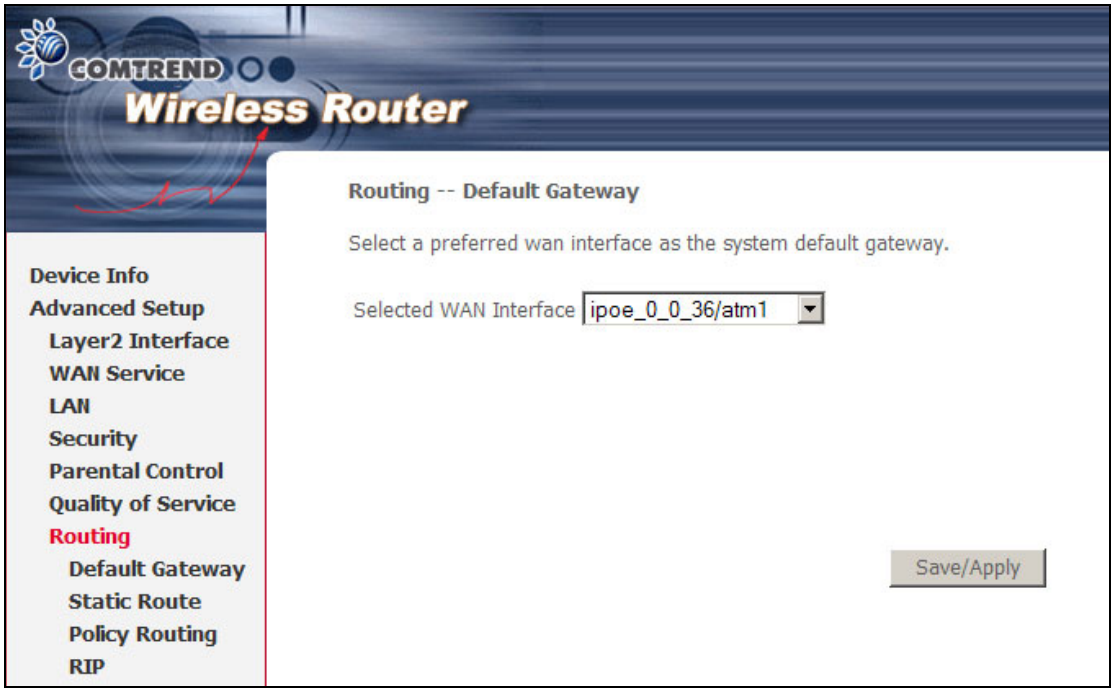
5.8 Routing

This option controls **Default Gateway, Static Route, Policy Routing** and **RIP**.

NOTE:	In bridge mode, the **RIP** screen is hidden while the other configuration screens are shown but ineffective.

5.8.1 Default Gateway

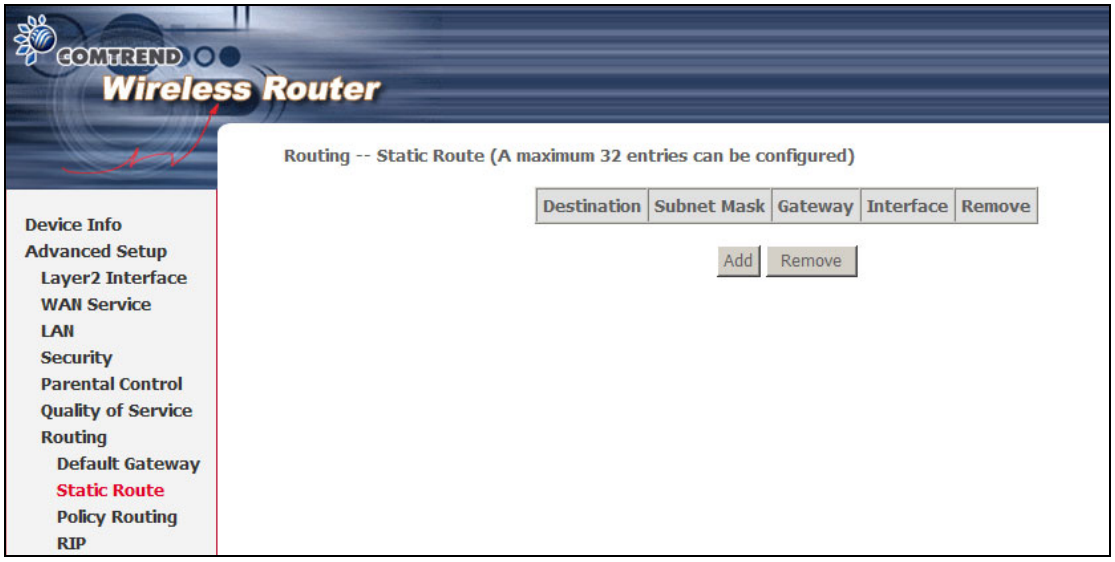
Select a WAN Interface as the default gateway and click **Save/Apply**.



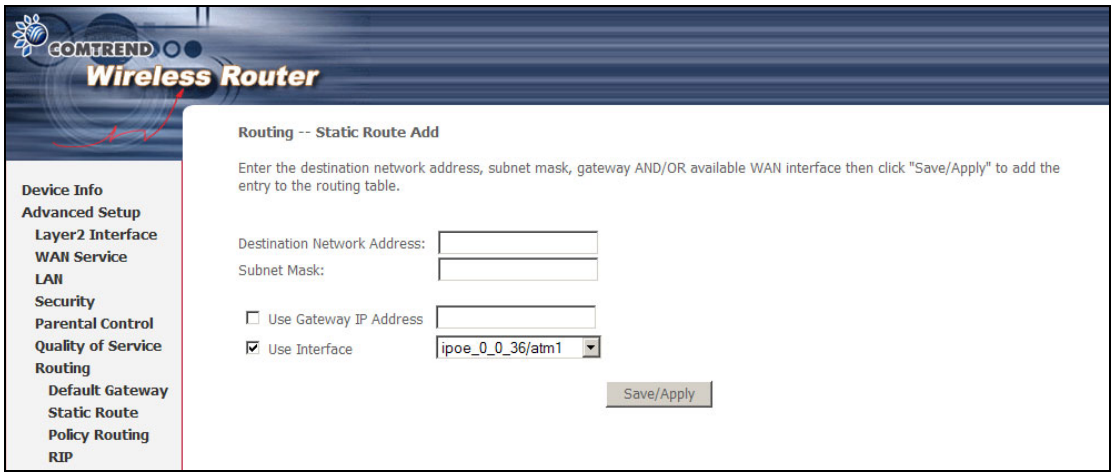
NOTE:	After enabling the Automatic Assigned Default Gateway, the device must be rebooted to activate the assigned default gateway.

5.8.2 Static Route

This option allows for the configuration of static routes by destination IP.
Click **Add** to create a static route or click **Remove** to delete a static route.



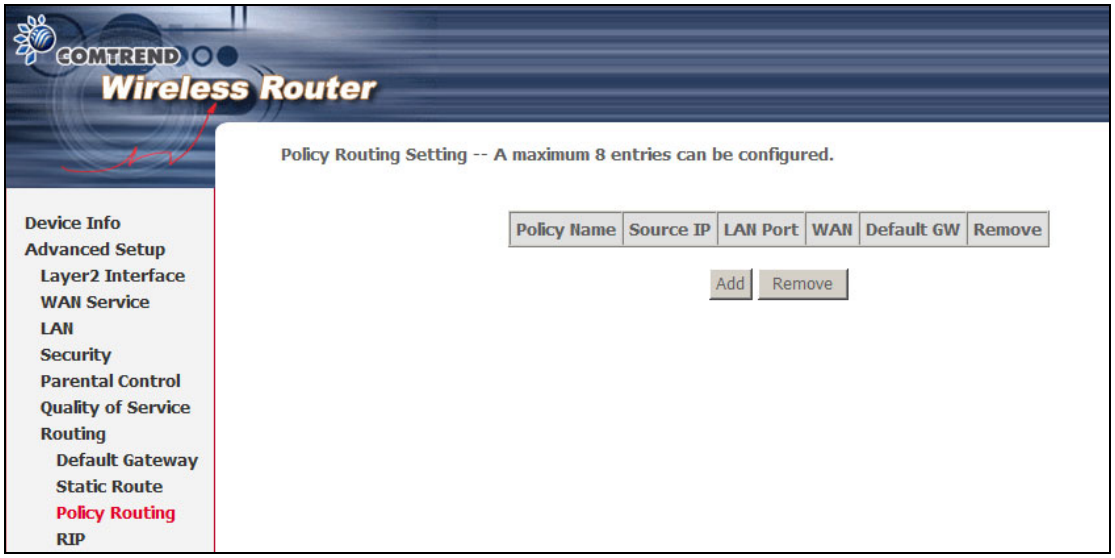
Click the **Add** button to display the following screen.



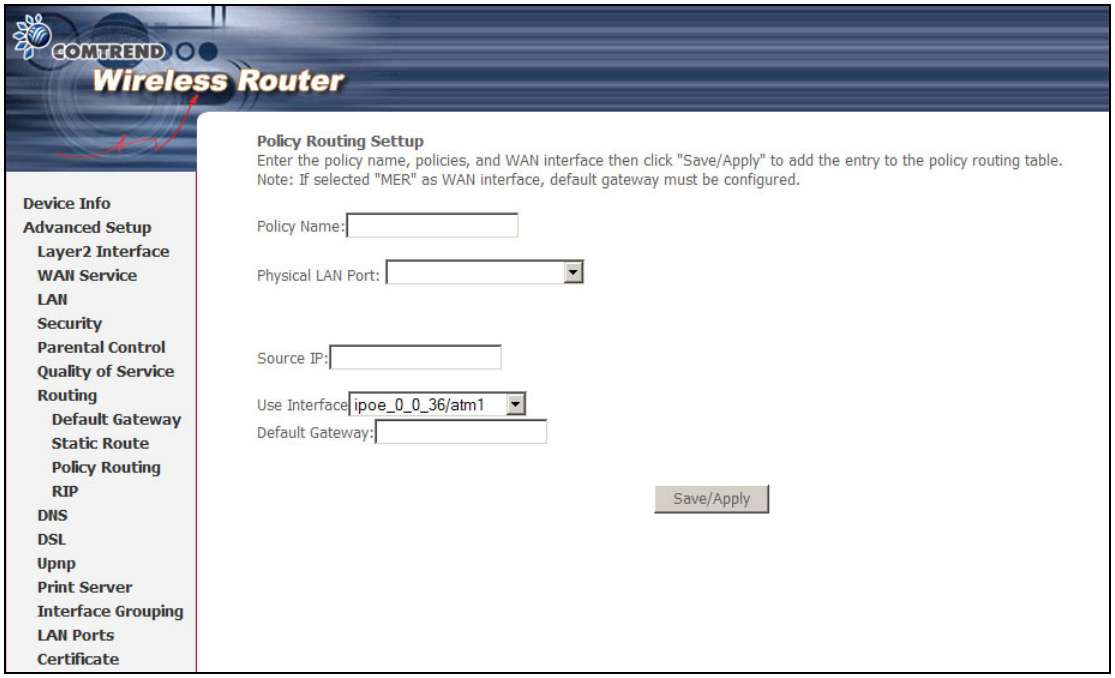
Enter Destination Network Address, Subnet Mask, Gateway IP Address, and/or WAN Interface. Then, click **Save/Apply** to add the entry to the routing table.

5.8.3 Policy Routing

This option allows for the configuration of static routes by policy.
Click **Add** to create a routing policy or **Remove** to delete one.

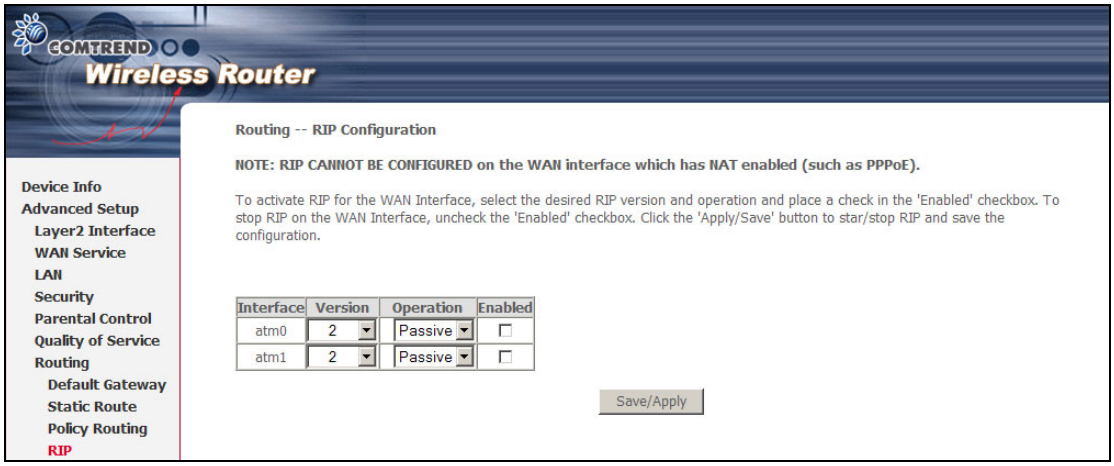


On the following screen, complete the form and click **Save/Apply** to create a policy.



5.8.4 RIP

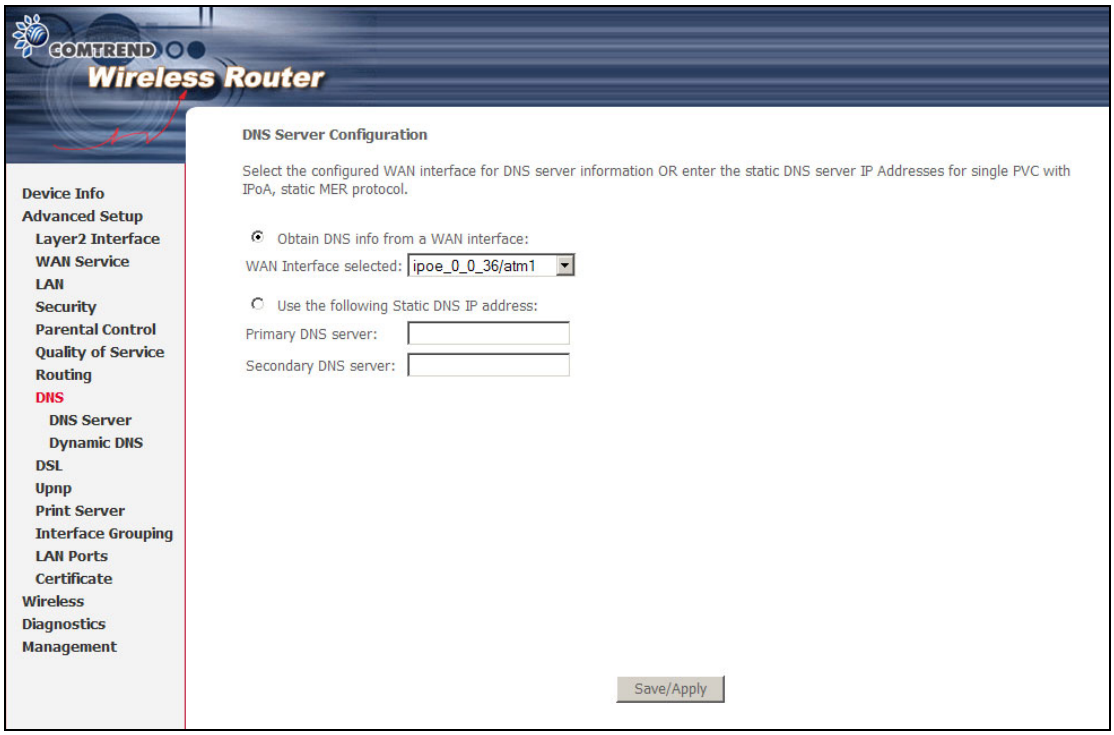
To activate RIP, configure the RIP version/operation mode and select the **Enabled** checkbox ☑ for at least one WAN interface before clicking **Save/Apply**.



5.9 DNS

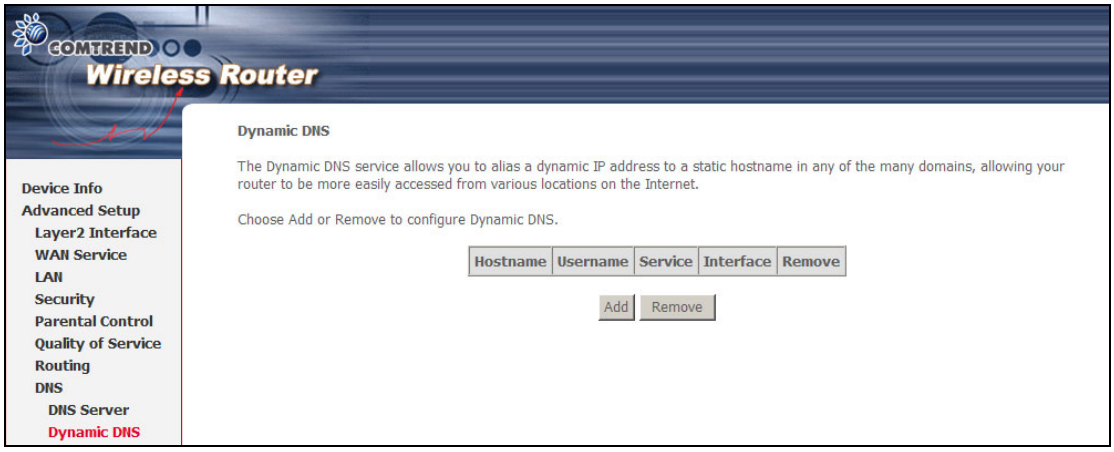
5.9.1 DNS Server

To obtain DNS information from a WAN interface, select the first radio button and then choose a WAN interface from the drop-down box. For Static DNS, select the second radio button and enter the IP Address of the primary (and secondary) DNS server(s). Click **Save/Apply** to save the new configuration.

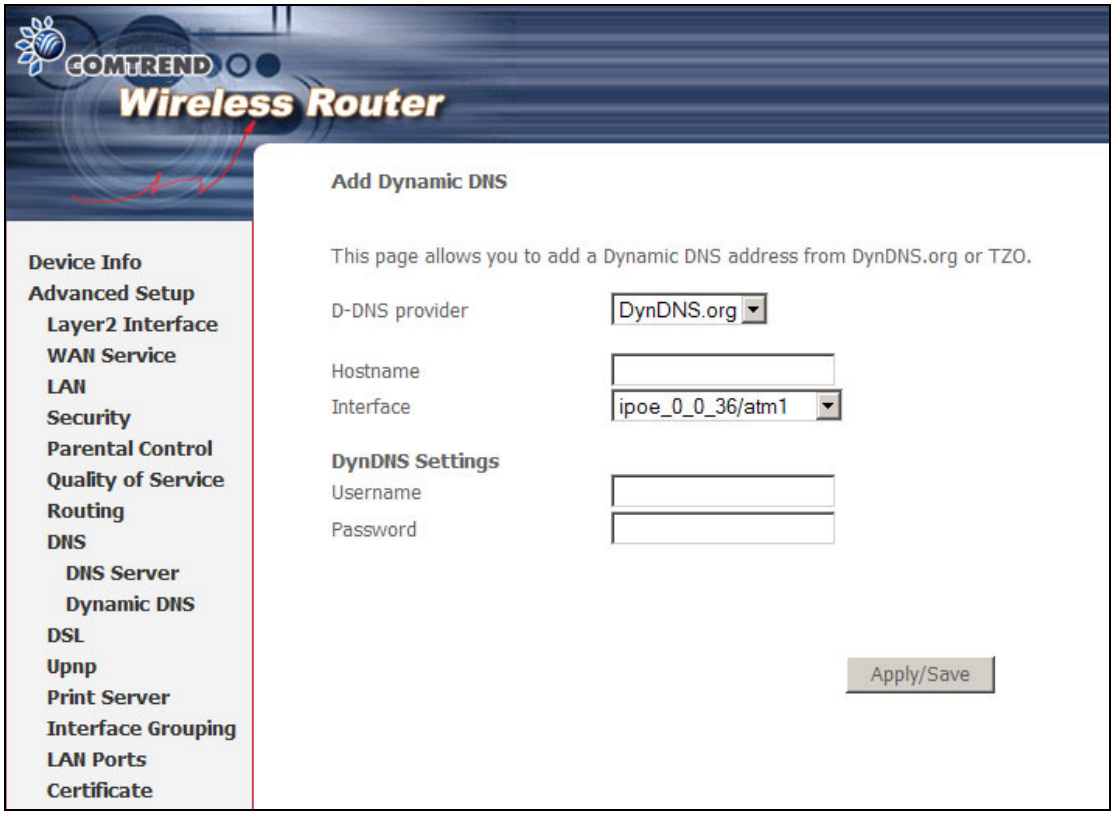


5.9.2 Dynamic DNS

The Dynamic DNS service allows you to map a dynamic IP address to a static hostname in any of many domains, allowing the CT-5364A to be more easily accessed from various locations on the Internet.



To add a dynamic DNS service, click **Add**. The following screen will display.

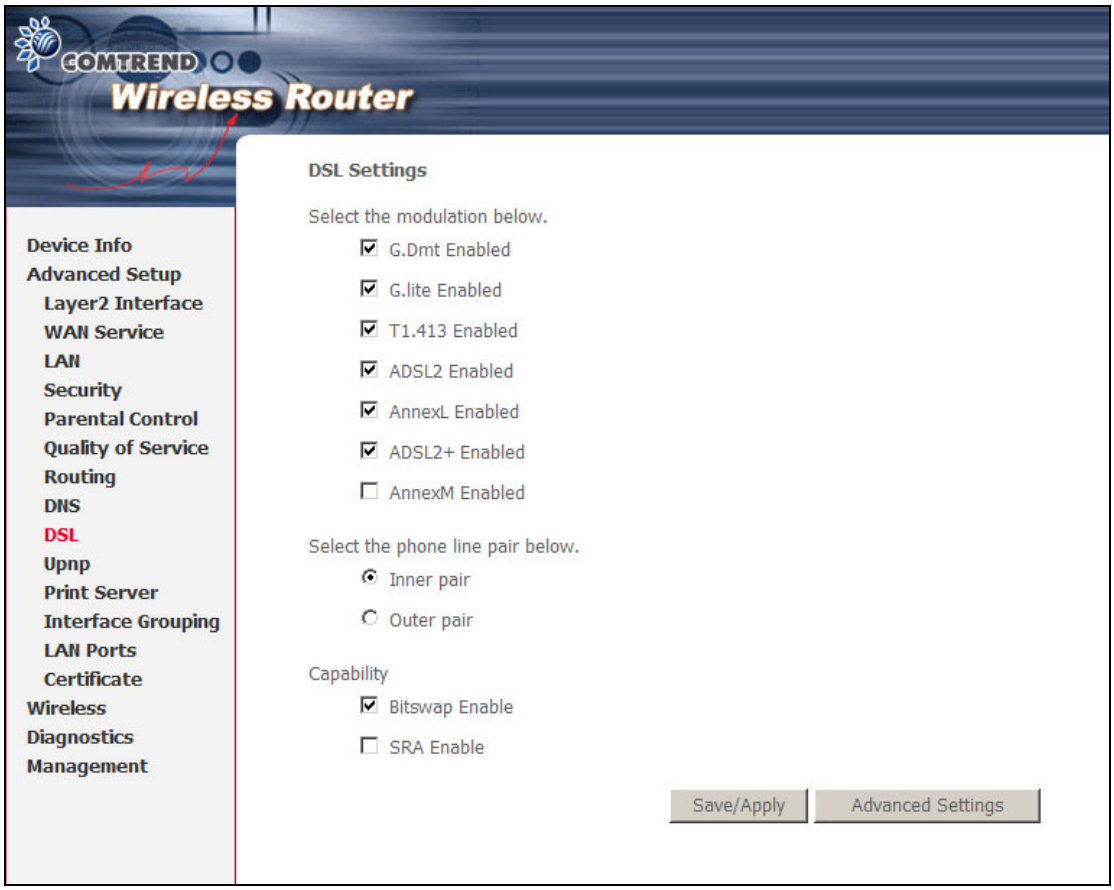


Consult the table below for field descriptions.

Field	Description
D-DNS provider	Select a dynamic DNS provider from the list
Hostname	Enter the name of the dynamic DNS server
Interface	Select the interface from the list
Username	Enter the username of the dynamic DNS server
Password	Enter the password of the dynamic DNS server

5.10 DSL

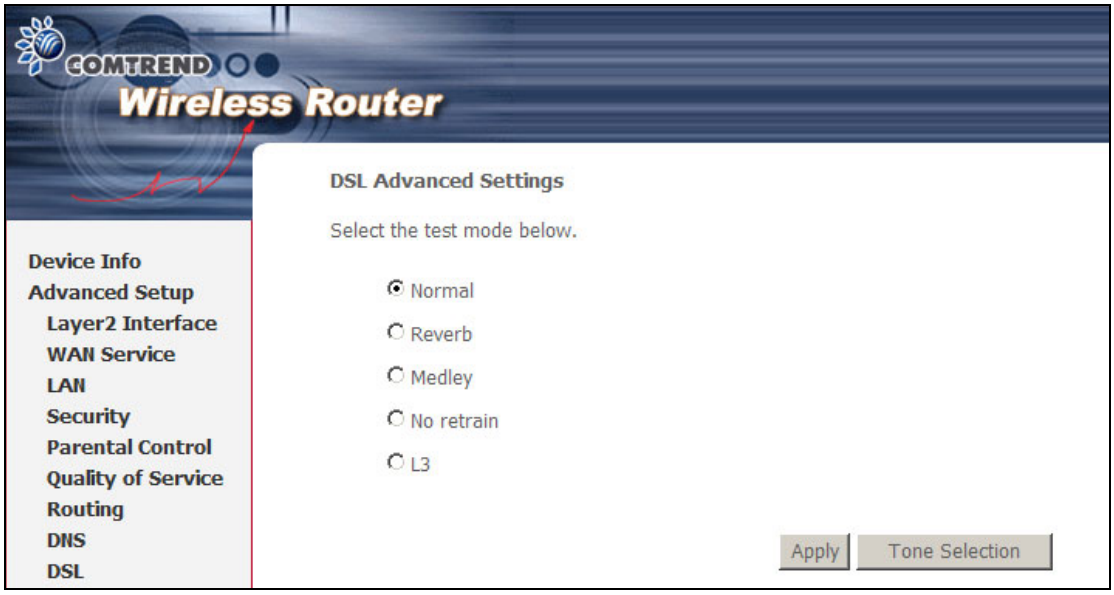
The DSL Settings screen allows for the selection of DSL modulation modes.
For optimum performance, the modes selected should match those of your ISP.



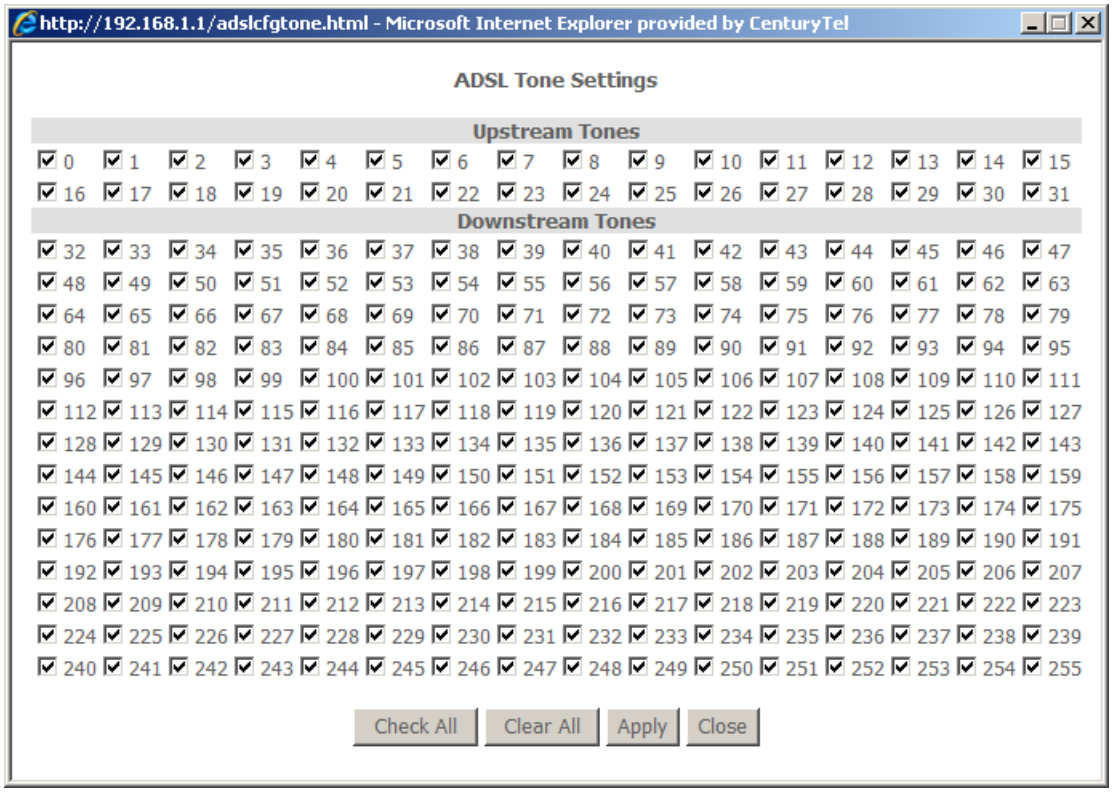
DSL Mode	**Data Transmission Rate** - Mbit/s (Megabits per second)
G.Dmt	Downstream: 12 Mbit/s Upstream: 1.3 Mbit/s
G.lite	Downstream: 4 Mbit/s Upstream: 0.5 Mbit/s
T1.413	Downstream: 8 Mbit/s Upstream: 1.0 Mbit/s
ADSL2	Downstream: 12 Mbit/s Upstream: 1.0 Mbit/s
AnnexL	Supports longer loops but with reduced transmission rates
ADSL2+	Downstream: 24 Mbit/s Upstream: 1.0 Mbit/s
AnnexM	Downstream: 24 Mbit/s Upstream: 3.5 Mbit/s
Options	**Description**
Inner/Outer Pair	Select the inner or outer pins of the twisted pair (RJ11 cable)
Bitswap Enable	Enables adaptive handshaking functionality
SRA Enable	Enables Seamless Rate Adaptation (SRA)

Advanced DSL Settings

Click **Advanced Settings** to reveal additional options. On the following screen you can select a test mode or modify tones by clilcking **Tone Selection**. Click **Apply** to implement these settings and return to the previous screen.

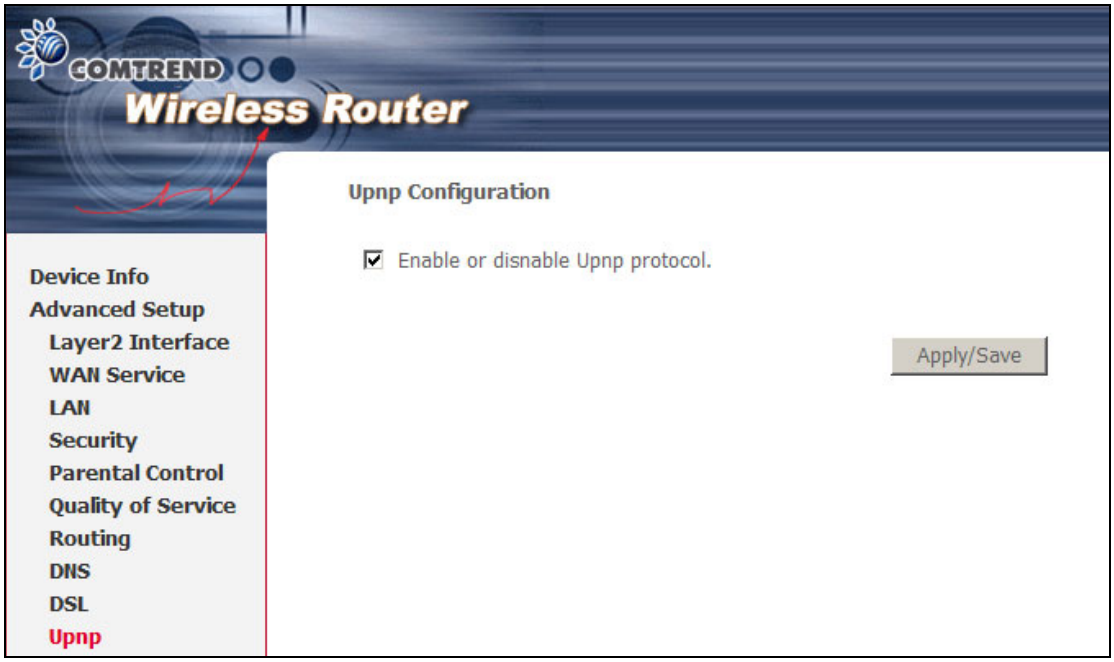


On this screen you select the tones you want activated, then click **Apply** and **Close**.



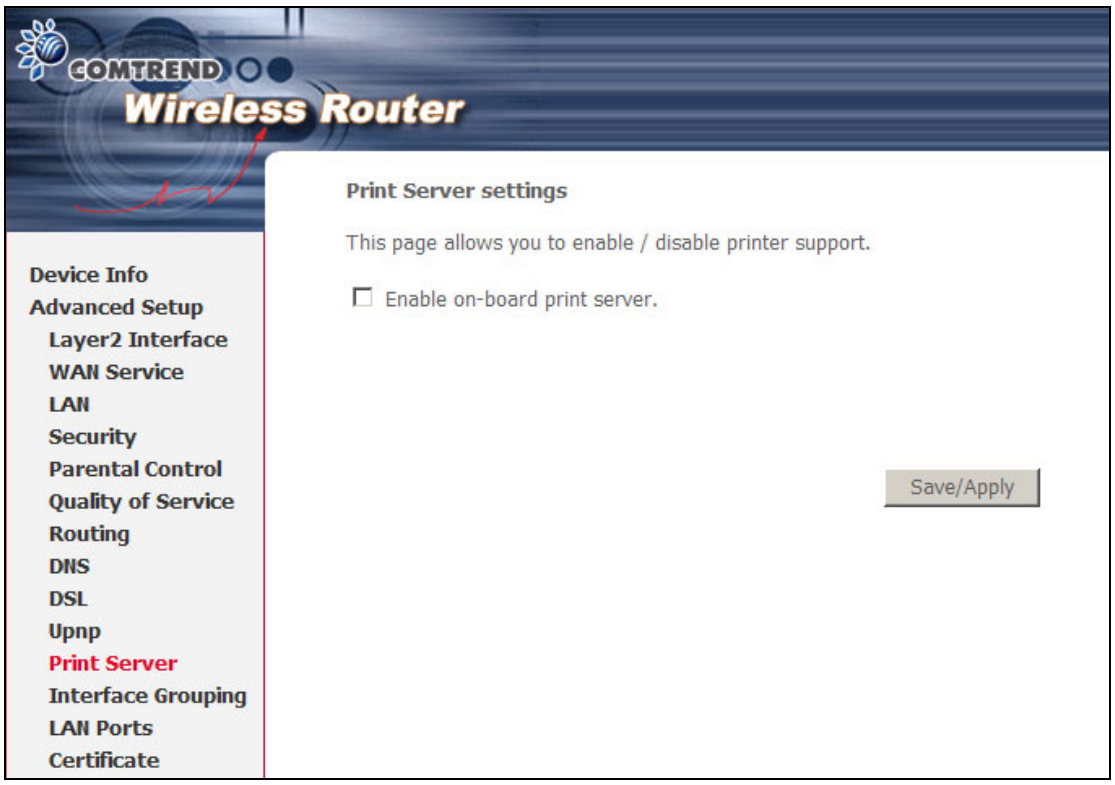
5.11 UPnP

Select the checkbox ☑ provided and click **Apply/Save** to enable UPnP protocol.



5.12 Print Server

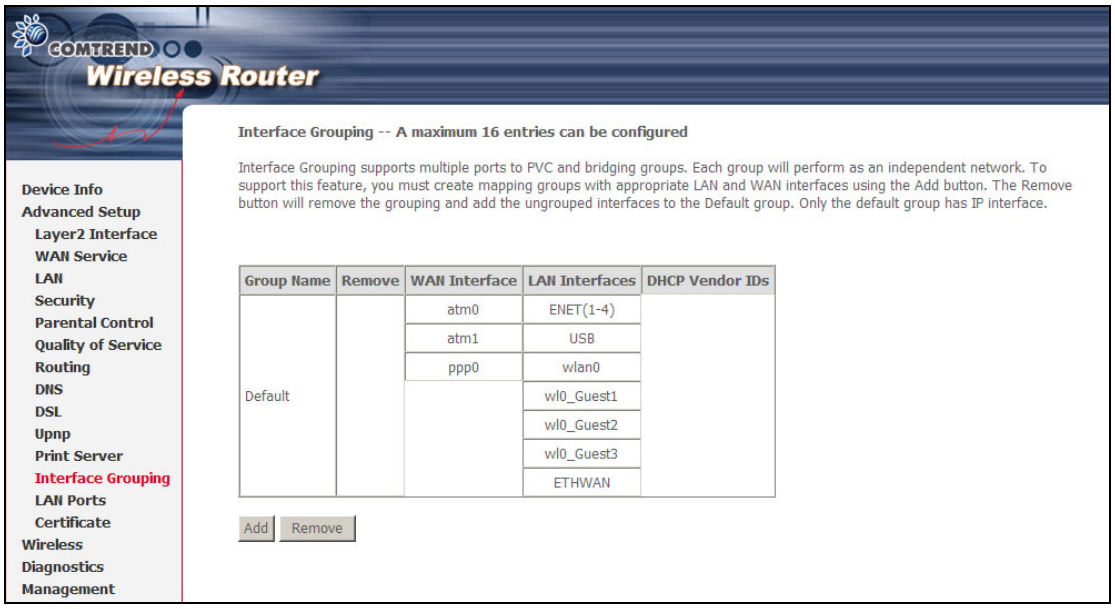
The CT-5364A provides printer support through a high-speed USB2.0 host port. Please refer to **Appendix F - Printer Server** for detailed installation instructions.



5.13 Interface Grouping

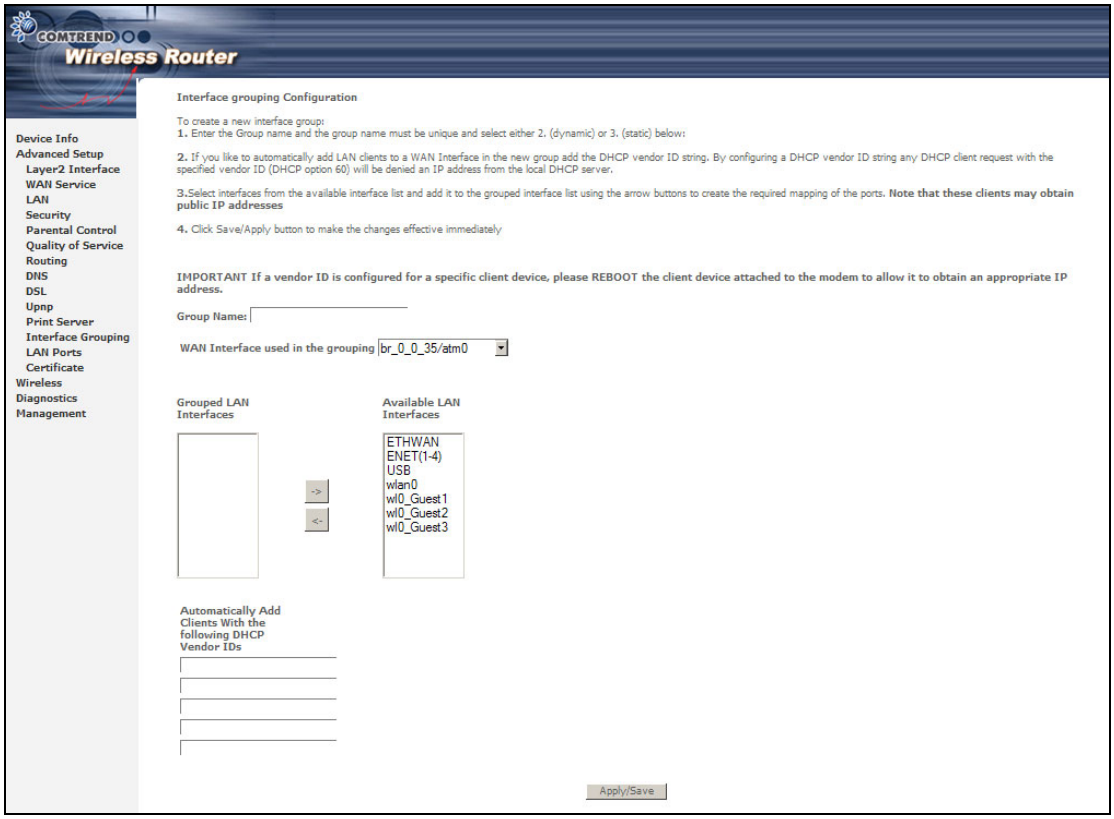
Interface Grouping supports multiple ports to PVC and bridging groups. Each group performs as an independent network. To use this feature, you must create mapping groups with appropriate LAN and WAN interfaces using the **Add** button.

The **Remove** button removes mapping groups, returning the ungrouped interfaces to the Default group. Only the default group has an IP interface.



To add an Interface Group, click the **Add** button. The following screen will appear. It lists the available and grouped interfaces. Follow the instructions shown here.

NOTE:	To assign Ethernet Ports ENET(1-4) to separate Interface Groups, the VLAN Port feature must be activated. See section 5.14 for details.


COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
WAN Service
LAN
Security
Parental Control
Quality of Service
Routing
DNS
DSL
Upnp
Print Server
Interface Grouping
LAN Ports
Certificate
Wireless
Diagnostics
Management
Interface grouping Configuration
To create a new interface group:
1. Enter the Group name and the group name must be unique and select either 2. (dynamic) or 3. (static) below:
2. If you like to automatically add LAN clients to a WAN Interface in the new group add the DHCP vendor ID string. By configuring a DHCP vendor ID string any DHCP client request with the specified vendor ID (DHCP option 60) will be denied an IP address from the local DHCP server.
3.Select interfaces from the available interface list and add it to the grouped interface list using the arrow buttons to create the required mapping of the ports. Note that these clients may obtain public IP addresses
4. Click Save/Apply button to make the changes effective immediately
IMPORTANT If a vendor ID is configured for a specific client device, please REBOOT the client device attached to the modem to allow it to obtain an appropriate IP address.
Group Name:
WAN Interface used in the grouping
br_0_0_35/atm0
Grouped LAN Interfaces
Available LAN Interfaces
ETHWAN
ENET(1-4)
USB
wlan0
wl0_Guest1
wl0_Guest2
wl0_Guest3
->
<-
Automatically Add Clients With the following DHCP Vendor IDs
Apply/Save

DHCP Vendor IDs

Add support to automatically map LAN interfaces using DHCP vendor ID (option 60). The local DHCP server will forward these types of requests to a remote DHCP server.

For example, imagine there are 4 PVCs (0/33, 0/36, 0/37, 0/38), VPI/VCI=0/33 is for PPPoE while the other PVCs are for IP set-top box use, and the LAN interfaces are ENET1, ENET2, ENET3, and ENET4. The Interface Grouping configuration will be:

1. Default: ENET1, ENET2, ENET3, and ENET4.
2. Video: nas_0_36, nas_0_37, and nas_0_38. The DHCP vendor ID is "Video".

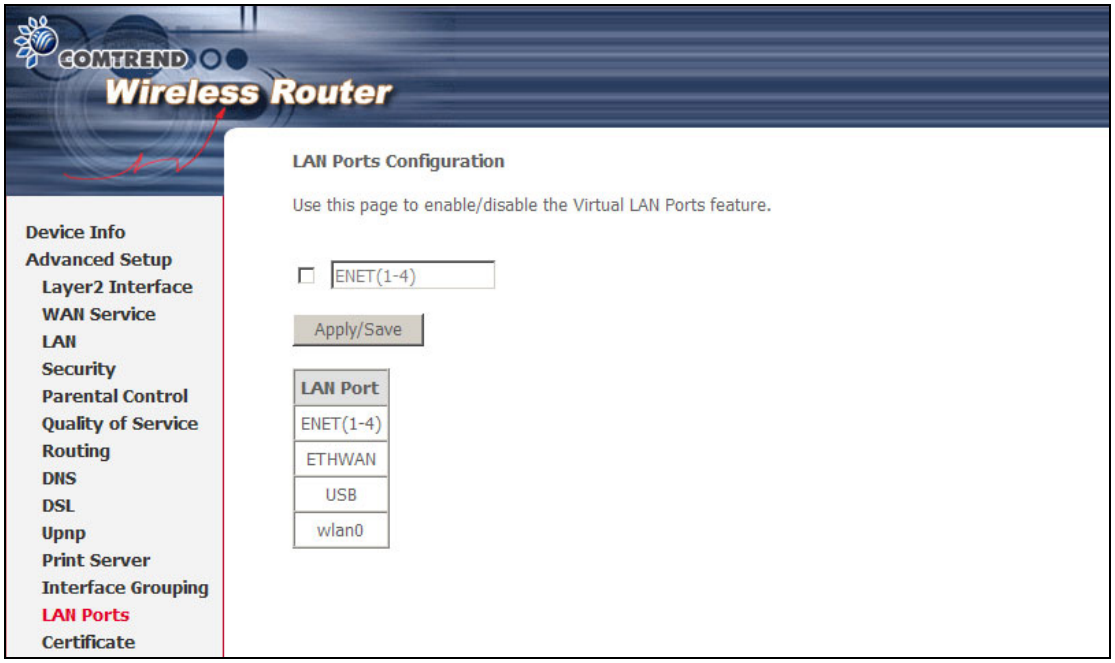
The local DHCP server is running on "Default" and the remote DHCP server is running on PVC 0/36 (i.e. for set-top box use only). LAN side clients can get IP addresses from the CPE's DHCP server and access the Internet via PPPoE (0/33).

If a set-top box is connected to ENET1 and sends a DHCP request with vendor ID "Video", the local DHCP server will forward this request to the remote DHCP server. The Interface Grouping configuration will automatically change to the following:

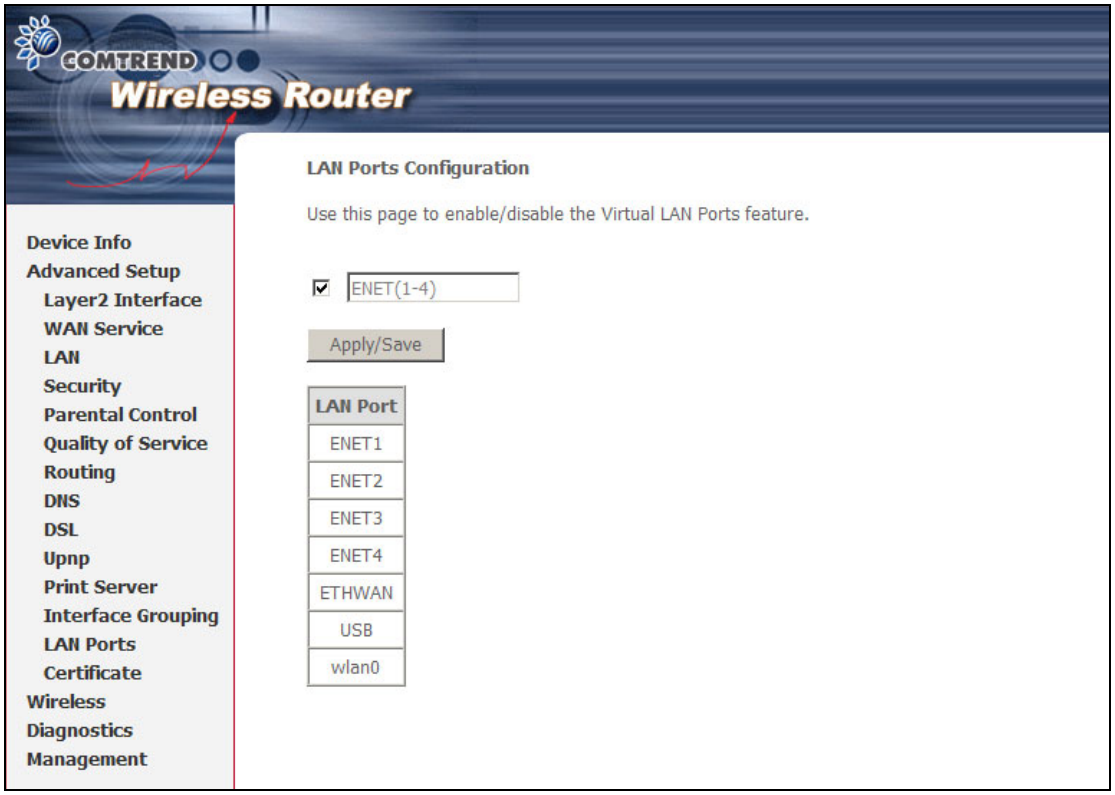
1. Default: ENET2, ENET3, and ENET4.
2. Video: nas_0_36, nas_0_37, nas_0_38, and ENET1.

5.14 LAN Ports

This screen controls the Virtual LAN (VLAN) Ports feature, which assigns Ethernet LAN ports ENET(1-4) to a static VLAN configuration. This feature must be activated to assign Ethernet Ports to separate Interface Groups (see section 5.13).



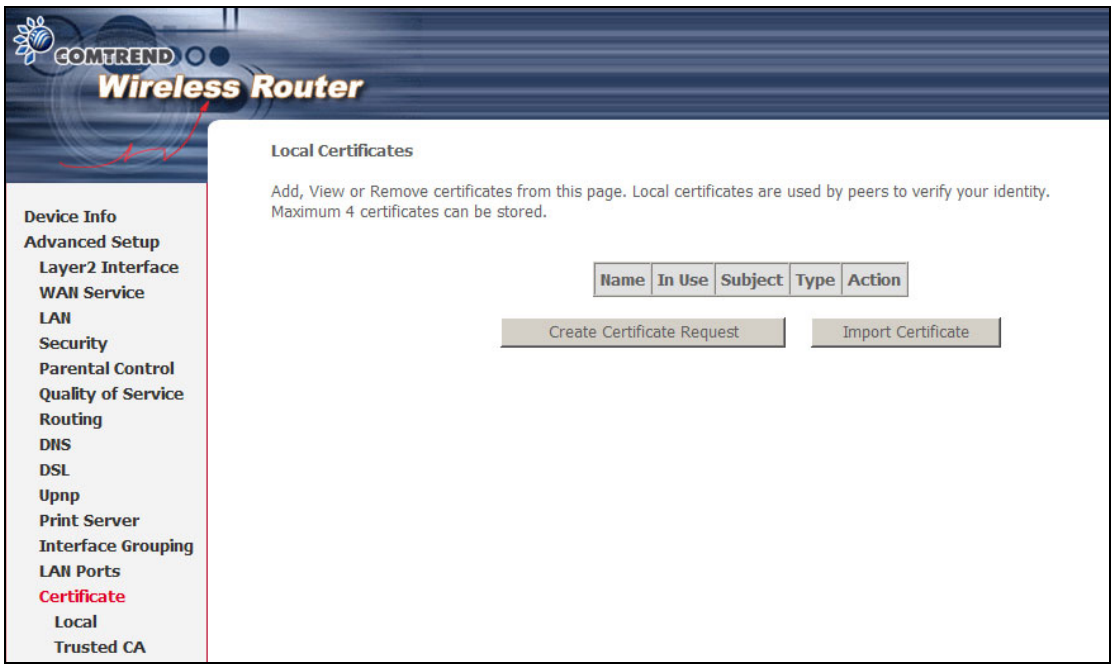
To enable Virtual LAN ports, select the checkbox ☑ and click **Apply/Save**. The ENET(1-4) port will separate into individual VLAN ports (ENET1-4), as shown below.



5.15 Certificate

A certificate is a public key, attached with its owner's information (company name, server name, personal real name, contact e-mail, postal address, etc) and digital signatures. There will be one or more digital signatures attached to the certificate, indicating that these entities have verified that this certificate is valid.

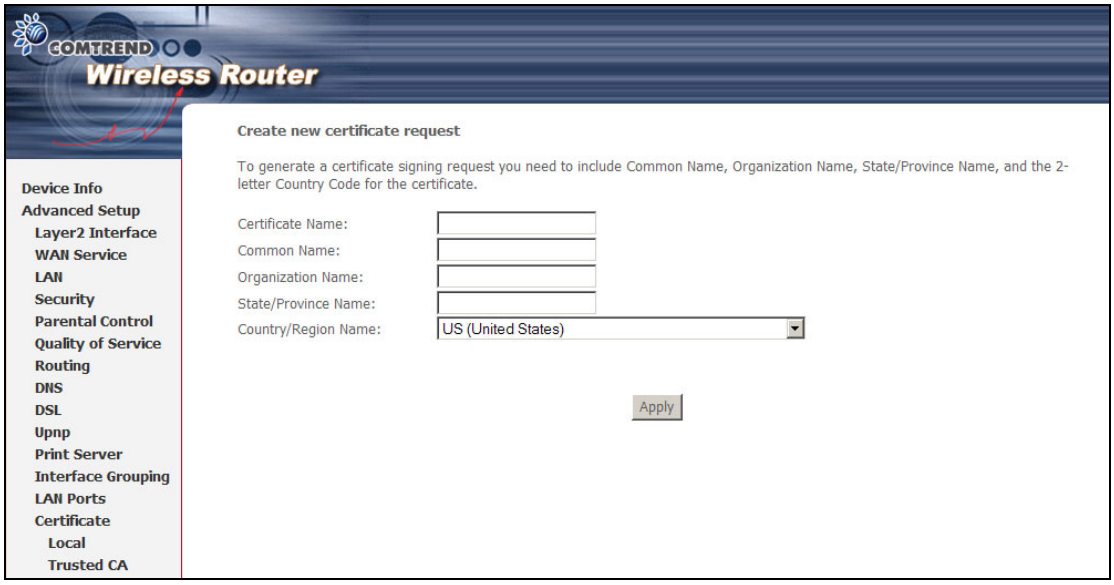
5.15.1 Local



CREATE CERTIFICATE REQUEST

Click **Create Certificate Request** to generate a certificate-signing request.

The certificate-signing request can be submitted to the vendor/ISP/ITSP to apply for a certificate. Some information must be included in the certificate-signing request. Your vendor/ISP/ITSP will ask you to provide the information they require and to provide the information in the format they regulate. Enter the required information and click **Apply** to generate a private key and a certificate-signing request.

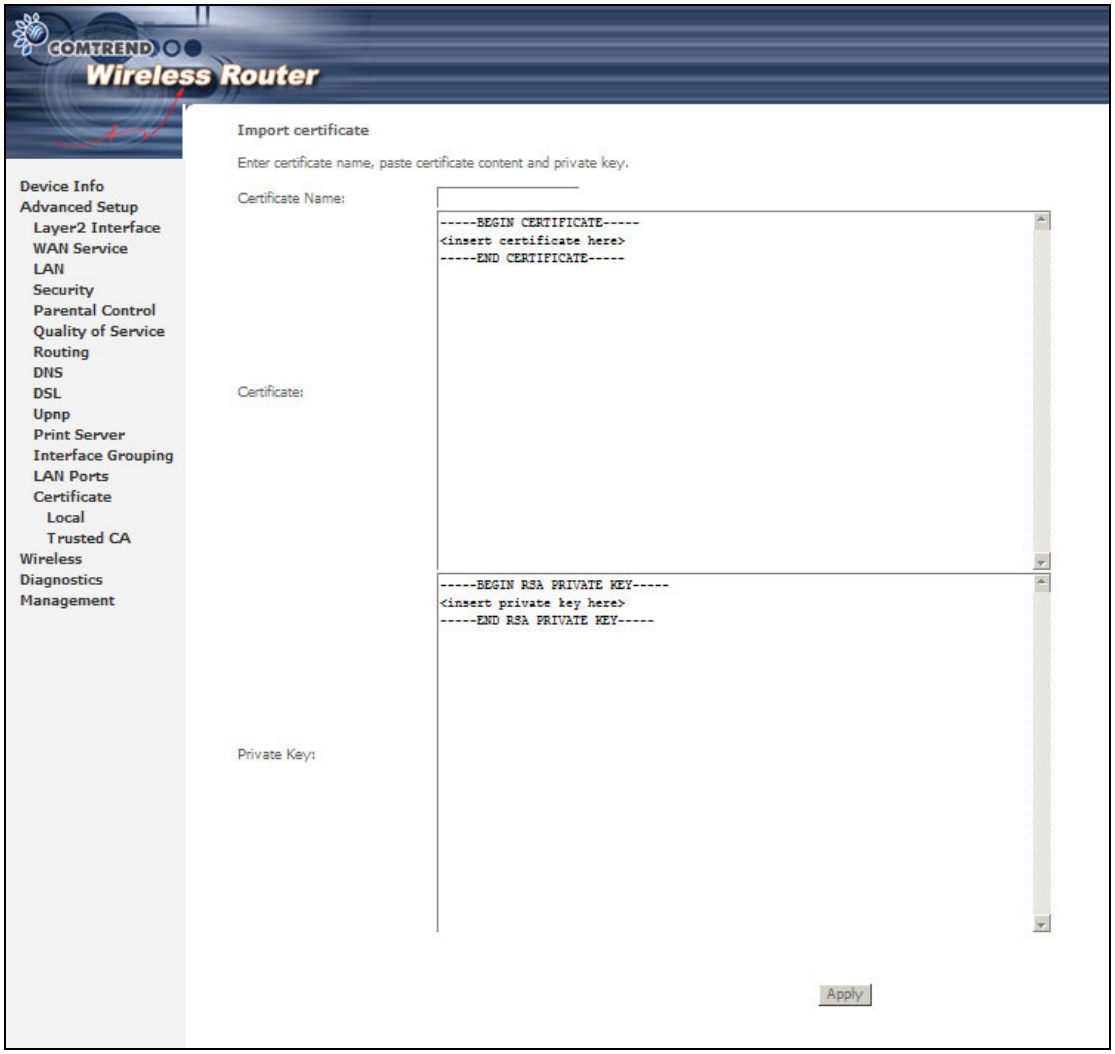


The following table is provided for your reference.

Field	Description
Certificate Name	A user-defined name for the certificate.
Common Name	Usually, the fully qualified domain name for the machine.
Organization Name	The exact legal name of your organization. Do not abbreviate.
State/Province Name	The state or province where your organization is located. It cannot be abbreviated.
Country/Region Name	The two-letter ISO abbreviation for your country.

IMPORT CERTIFICATE

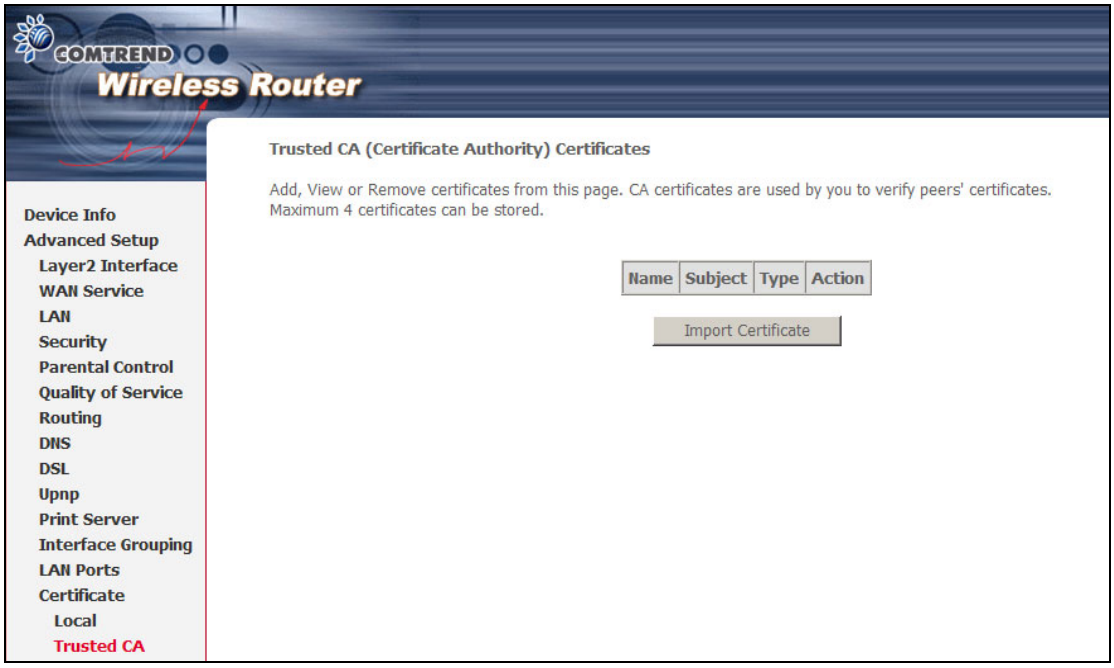
Click **Import Certificate** to paste the certificate content and the private key provided by your vendor/ISP/ITSP into the corresponding boxes shown below.



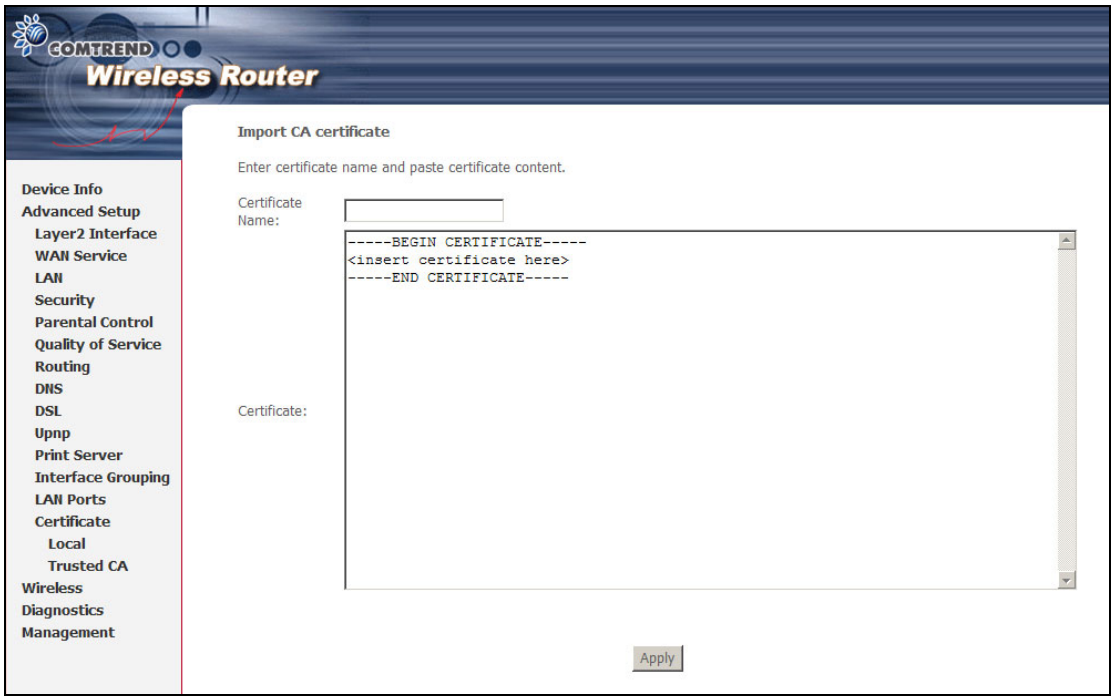
Enter a certificate name and click **Apply** to import the local certificate.

5.15.2 Trusted CA

CA is an abbreviation for Certificate Authority, which is a part of the X.509 system. It is itself a certificate, attached with the owner information of this certificate authority; but its purpose is not encryption/decryption. Its purpose is to sign and issue certificates, in order to prove that these certificates are valid.



Click **Import Certificate** to paste the certificate content of your trusted CA. The CA certificate content will be provided by your vendor/ISP/ITSP and is used to authenticate the Auto-Configuration Server (ACS) that the CPE will connect to.



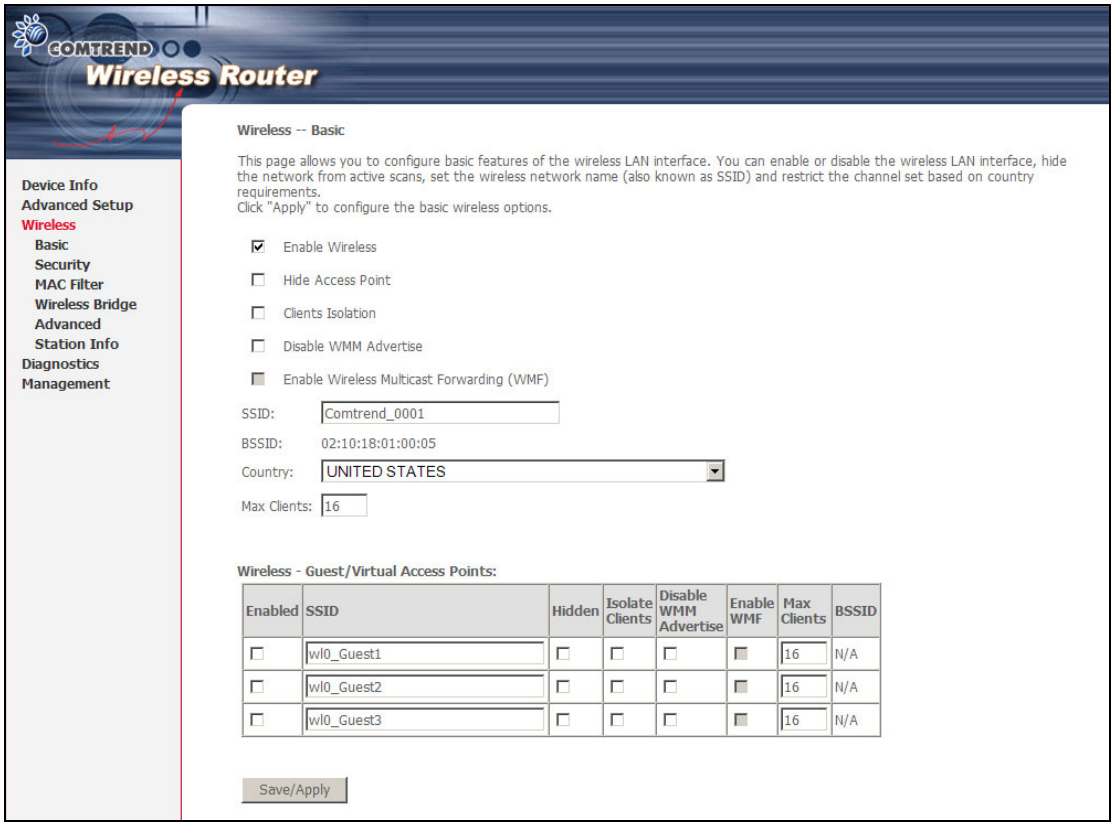
Enter a certificate name and click **Apply** to import the CA certificate.

Chapter 6 Wireless

The Wireless menu provides access to the wireless options discussed below.

6.1 Basic

The Basic option allows you to configure basic features of the wireless LAN interface. Among other things, you can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID) and restrict the channel set based on country requirements.



Click **Save/Apply** to apply the selected wireless options.

Consult the table below for descriptions of all these options.

Option	Description
Enable Wireless	A checkbox ☑ that enables or disables the wireless LAN interface. When selected, a set of basic wireless options will appear.
Hide Access Point	Select Hide Access Point to protect the access point from detection by wireless active scans. To check AP status in Windows XP, open **Network Connections** from the **start** Menu and select **View Available Network Connections**. If the access point is hidden, it will not be listed there. To connect a client to a hidden access point, the station must add the access point manually to its wireless configuration.

Option	Description
Clients Isolation	When enabled, it prevents client PCs from seeing one another in My Network Places or Network Neighborhood. Also, prevents one wireless client communicating with another wireless client.
Disable WMM Advertise	Stops the router from 'advertising' its Wireless Multimedia (WMM) functionality, which provides basic quality of service for time-sensitive applications (e.g. VoIP, Video).
Enable Wireless Multicast Forwarding	Not supported.
SSID [1-32 characters]	Sets the wireless network name. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that user will not be granted access.
BSSID	The BSSID is a 48-bit identity used to identify a particular BSS (Basic Service Set) within an area. In Infrastructure BSS networks, the BSSID is the MAC (Media Access Control) address of the AP (Access Point); and in Independent BSS or ad hoc networks, the BSSID is generated randomly.
Country	A drop-down menu that permits worldwide and specific national settings. Local regulations limit channel range: US= worldwide, Japan=1-14, Jordan= 10-13, Israel= 1-13
Max Clients	The maximum number of clients that can access the router.
Wireless - Guest / Virtual Access Points	This router supports multiple SSIDs called Guest SSIDs or Virtual Access Points. To enable one or more Guest SSIDs select the checkboxes ☑ in the **Enabled** column. To hide a Guest SSID select its checkbox ☑ in the **Hidden** column. Do the same for **Isolate Clients** and **Disable WMM Advertise**. For a description of these two functions, see the previous entries for "Clients Isolation" and "Disable WMM Advertise". Similarly, for **Enable WMF**, **Max Clients** and **BSSID**, consult the matching entries in this table. **NOTE:** Remote wireless hosts cannot scan Guest SSIDs.

6.2 Security

The following screen appears when Wireless Security is selected. The options shown here allow you to configure security features of the wireless LAN interface.

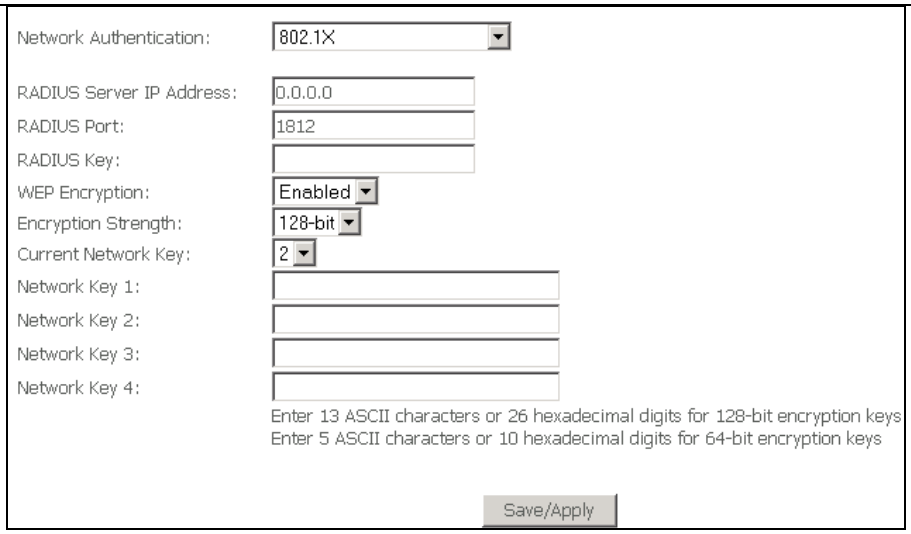
Click **Save/Apply** to implement new configuration settings.

WIRELESS SECURITY

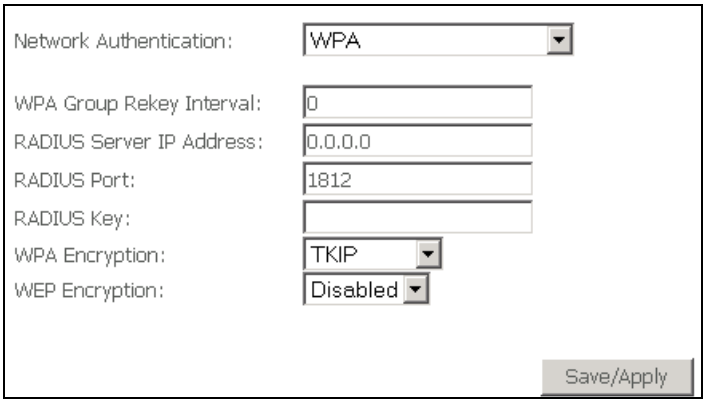
Wireless security settings can be configured according to Wi-Fi Protected Setup (WPS) or Manual Setup. The WPS method configures security settings automatically (see section 6.2.1) while the Manual Setup method requires that the user configure these settings using the Web User Interface (see the table below).

Select SSID
Select the wireless network name from the drop-down box. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that client will not be granted access.

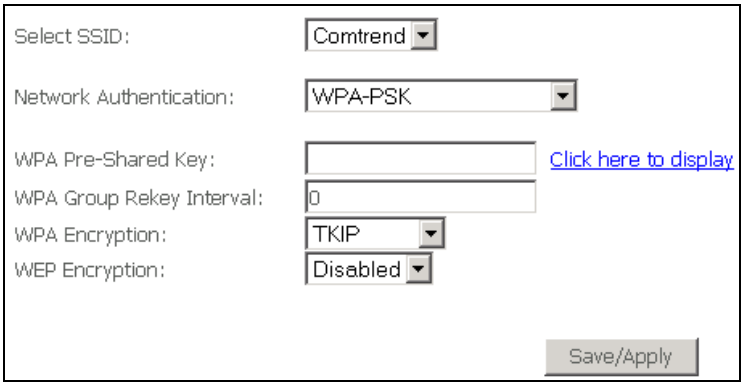
Network Authentication
This option specifies whether a network key is used for authentication to the wireless network. If network authentication is set to Open, then no authentication is provided. Despite this, the identity of the client is still verified. Each authentication type has its own settings. For example, selecting 802.1X authentication will reveal the RADIUS Server IP address, Port and Key fields. WEP Encryption will also be enabled as shown below.



The settings for WPA authentication are shown below.



The settings for WPA-PSK authentication are shown next.



WEP Encryption

This option specifies whether data sent over the network is encrypted. The same network key is used for data encryption and network authentication. Four network keys can be defined although only one can be used at any one time. Use the Current Network Key list box to select the appropriate network key.

Security options include authentication and encryption services based on the wired equivalent privacy (WEP) algorithm. WEP is a set of security services used to protect 802.11 networks from unauthorized access, such as eavesdropping; in this case, the capture of wireless network traffic. When data encryption is enabled,

secret shared encryption keys are generated and used by the source station and the destination station to alter frame bits, thus avoiding disclosure to eavesdroppers. Under shared key authentication, each wireless station is assumed to have received a secret shared key over a secure channel that is independent from the 802.11 wireless network communications channel.
Encryption Strength
This drop-down list box will display when WEP Encryption is enabled. The key strength is proportional to the number of binary bits comprising the key. This means that keys with a greater number of bits have a greater degree of security and are considerably more difficult to crack. Encryption strength can be set to either 64-bit or 128-bit. A 64-bit key is equivalent to 5 ASCII characters or 10 hexadecimal numbers. A 128-bit key contains 13 ASCII characters or 26 hexadecimal numbers. Each key contains a 24-bit header (an initiation vector) which enables parallel decoding of multiple streams of encrypted data.

6.2.1 WPS

Wi-Fi Protected Setup (WPS) is an industry standard that simplifies wireless security setup for certified network devices. Every WPS certified device has both a PIN number and a push button, located on the device or accessed through device software. The CT-5364A has both a WPS button on the side panel and a virtual button accessed from the web user interface (WUI).

Devices with the WPS logo (shown here) support WPS. If the WPS logo is not present on your device it still may support WPS, in this case, check the device documentation for the phrase "Wi-Fi Protected Setup".

NOTE:	WPS is only available in Open, WPA-PSK, WPA2-PSK and Mixed WPA2/WPA-PSK network authentication modes. Other authentication modes do not use WPS so they must be configured manually.

To configure security settings with WPS, follow the procedures below. You must choose either the Push-Button or PIN configuration method for Steps 6 and 7.

I. Setup

Step 1: Enable WPS by selecting **Enabled** from the drop down list box shown.

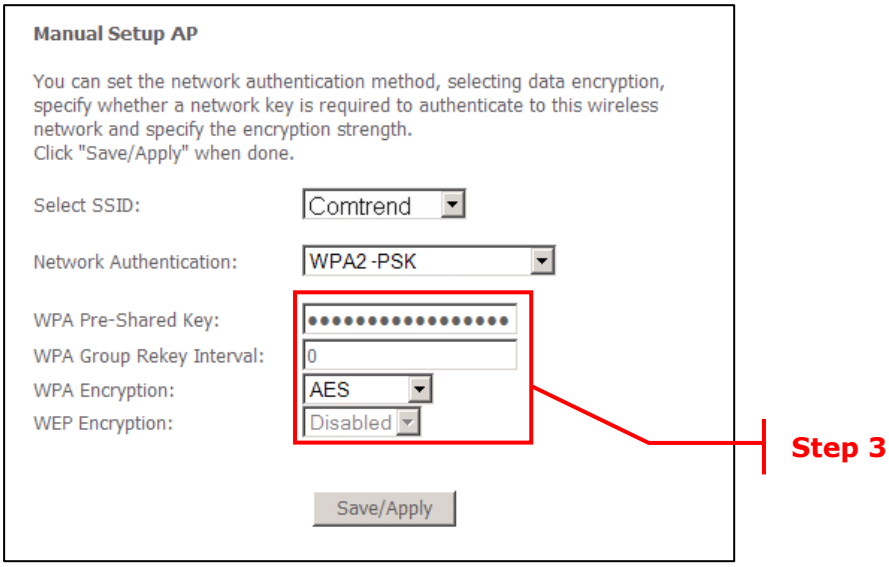
Step 2: Set the WSC AP Mode. **Configured** is used when the CT-5364A will assign security settings to clients. **Unconfigured** is used when an external client assigns security settings to the CT-5364A.

NOTES: Your client may or may not have the ability to provide security settings to the CT-5364A. If it does not, then you must set the WSC AP mode to Configured. Consult the device documentation to check its capabilities.

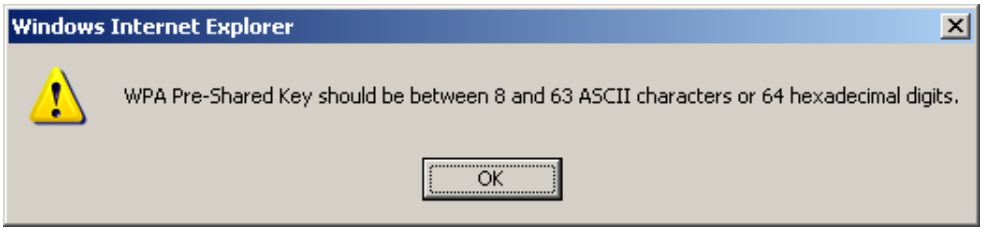
In addition, using Windows Vista, you can add an external registrar using the **StartAddER** button (Appendix E has detailed instructions).

II. NETWORK AUTHENTICATION

Step 3: Select Open, WPA-PSK, WPA2-PSK, or Mixed WPA2/WPA-PSK network authentication mode from the Manual Setup AP section of the Wireless Security screen. The example below shows WPA2-PSK mode.



Step 4: For the Pre-Shared Key (PSK) modes, enter a WPA Pre-Shared Key. You will see the following dialog box if the Key is too short or too long.



Step 5: Click the **Save/Apply** button at the bottom of the screen.

IIIa. PUSH-BUTTON CONFIGURATION

The WPS push-button configuration provides a semi-automated configuration

method. The WPS button on the rear panel of the router can be used for this purpose or the Web User Interface (WUI) can be used exclusively.

The WPS push-button configuration is described in the procedure below. It is assumed that the Wireless function is Enabled and that the router is configured as the Wireless Access Point (AP) of your WLAN. In addition, the wireless client must also be configured correctly and turned on, with WPS function enabled.

NOTE:	The wireless AP on the router searches for 2 minutes. If the router stops searching before you complete Step 7, return to Step 6.

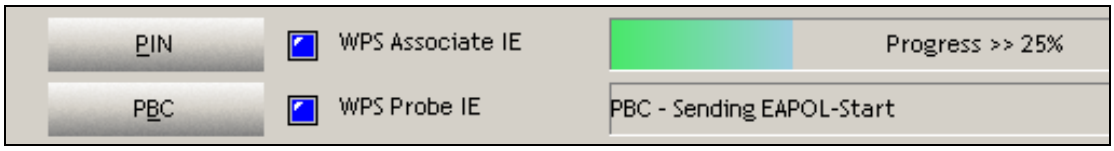
Step 6: **First method: WPS button**
Press the WPS button on the rear panel of the router. The WPS LED will blink to show that the router has begun searching for the client.

Second method: WUI virtual button
Select the Push-Button radio button in the WSC Setup section of the Wireless Security screen, as shown in **A** or **B** below, and then click the appropriate button based on the WSC AP mode selected in step 2.

A - For **Configured** mode, click the **Add Enrollee** button.

B - For **Unconfigured** mode, click the **Config AP** button.

Step 7: Go to your WPS wireless client and activate the push-button function. A typical WPS client screenshot is shown below as an example.



Now go to Step 8 (part IV. Check Connection) to check the WPS connection.

IIIb. WPS – PIN CONFIGURATION

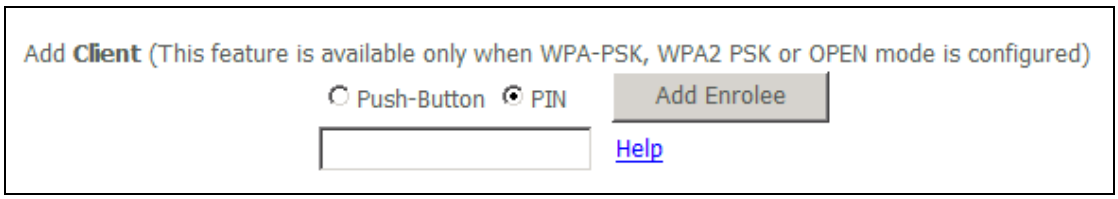
Using this method, security settings are configured with a personal identification number (PIN). The PIN can be found on the device itself or within the software. The PIN may be generated randomly in the latter case. To obtain a PIN number for your client, check the device documentation for specific instructions.

The WPS PIN configuration is described in the procedure below. It is assumed that the Wireless function is Enabled and that the router is configured as the Wireless Access Point (AP) of your wireless LAN. In addition, the wireless client must also be configured correctly and turned on, with WPS function enabled.

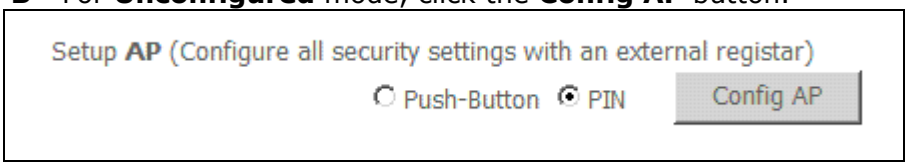
NOTE:	Unlike the push-button method, the pin method has no set time limit. This means that the router will continue searching until it finds a client.

Step 6: Select the PIN radio button in the WSC Setup section of the Wireless Security screen, as shown in **A** or **B** below, and then click the appropriate button based on the WSC AP mode selected in step 2.

A - For **Configured** mode, enter the client PIN in the box provided and then click the **Add Enrollee** button (see below).

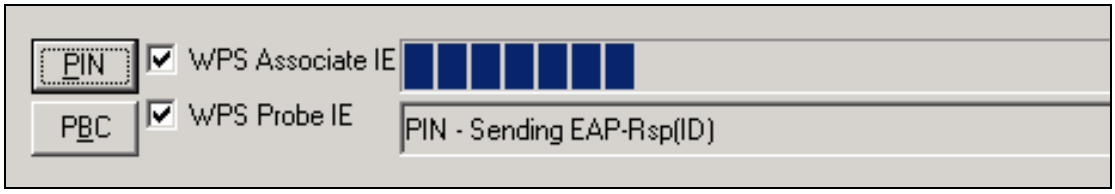

Add Client (This feature is available only when WPA-PSK, WPA2 PSK or OPEN mode is configured)
Push-Button
PIN
Add Enrolee
Help

B - For **Unconfigured** mode, click the **Config AP** button.



Step 7: Activate the PIN function on the wireless client. For **Configured** mode, the client must be configured as an Enrollee. For **Unconfigured** mode, the client must be configured as the Registrar. This is different from the External Registrar function provided in Windows Vista.

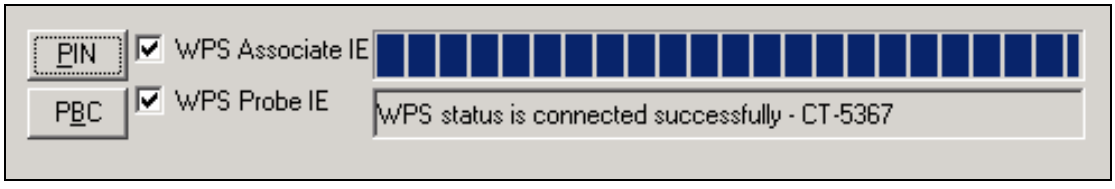
The figure below provides an example of a WPS client PIN function in-progress.



Now go to Step 8 (part IV. Check Connection) to check the WPS connection.

IV. CHECK CONNECTION

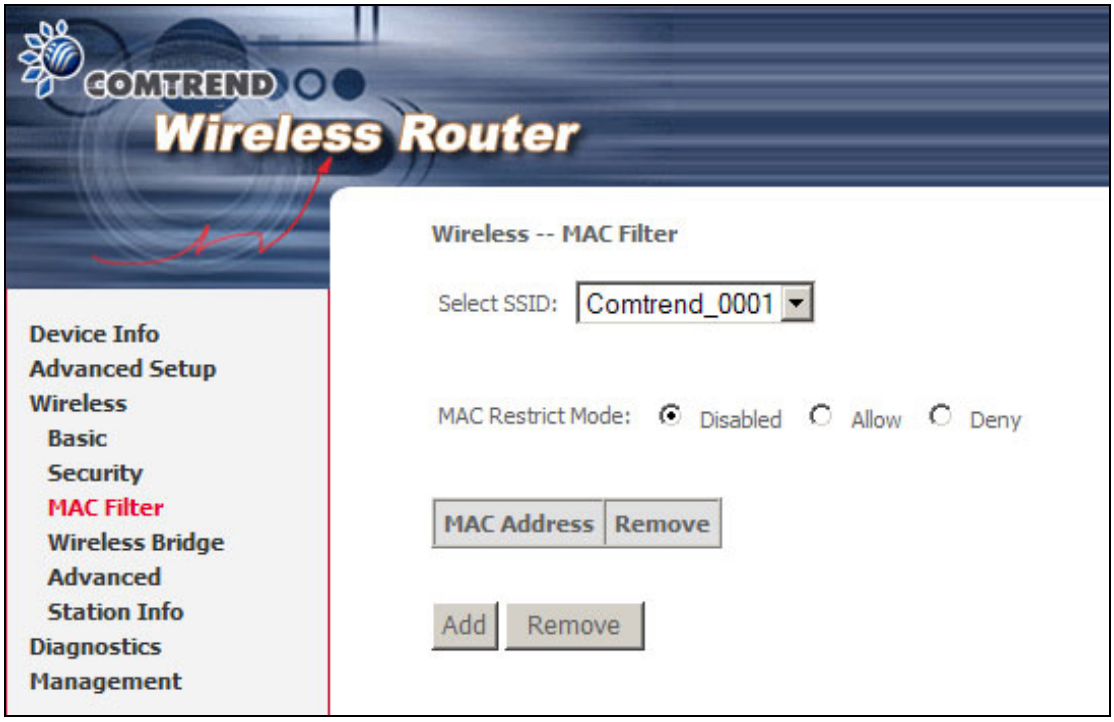
Step 8: If the WPS setup method was successful, you will be able access the wireless AP from the client. The client software should show the status. The example below shows that the connection established successfully.



You can also double-click the Wireless Network Connection icon from the Network Connections window (or the system tray) to confirm the status of the new connection.

6.3 MAC Filter

This option allows access to the router to be restricted based upon MAC addresses. To add a MAC Address filter, click the **Add** button shown below. To delete a filter, select it from the MAC Address table below and click the **Remove** button.

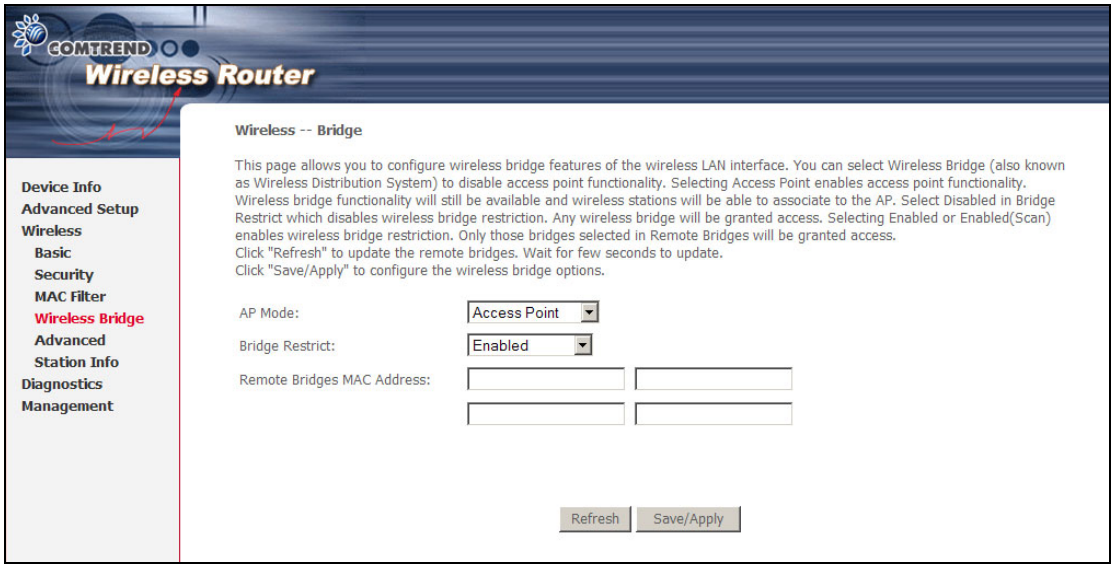


Option	Description
Select SSID	Select the wireless network name from the drop-down box. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that user will not be granted access.
MAC Restrict Mode	Disabled: MAC filtering is disabled. Allow: Permits access for the specified MAC addresses. Deny: Rejects access for the specified MAC addresses.
MAC Address	Lists the MAC addresses subject to the MAC Restrict Mode. A maximum of 60 MAC addresses can be added. Every network device has a unique 48-bit MAC address. This is usually shown as xx.xx.xx.xx.xx.xx, where xx are hexadecimal numbers.

After clicking the **Add** button, the following screen appears.
Enter the MAC address in the box provided and click **Save/Apply**.

6.4 Wireless Bridge

This screen allows for the configuration of wireless bridge features of the WLAN interface. See the table beneath for detailed explanations of the various options.

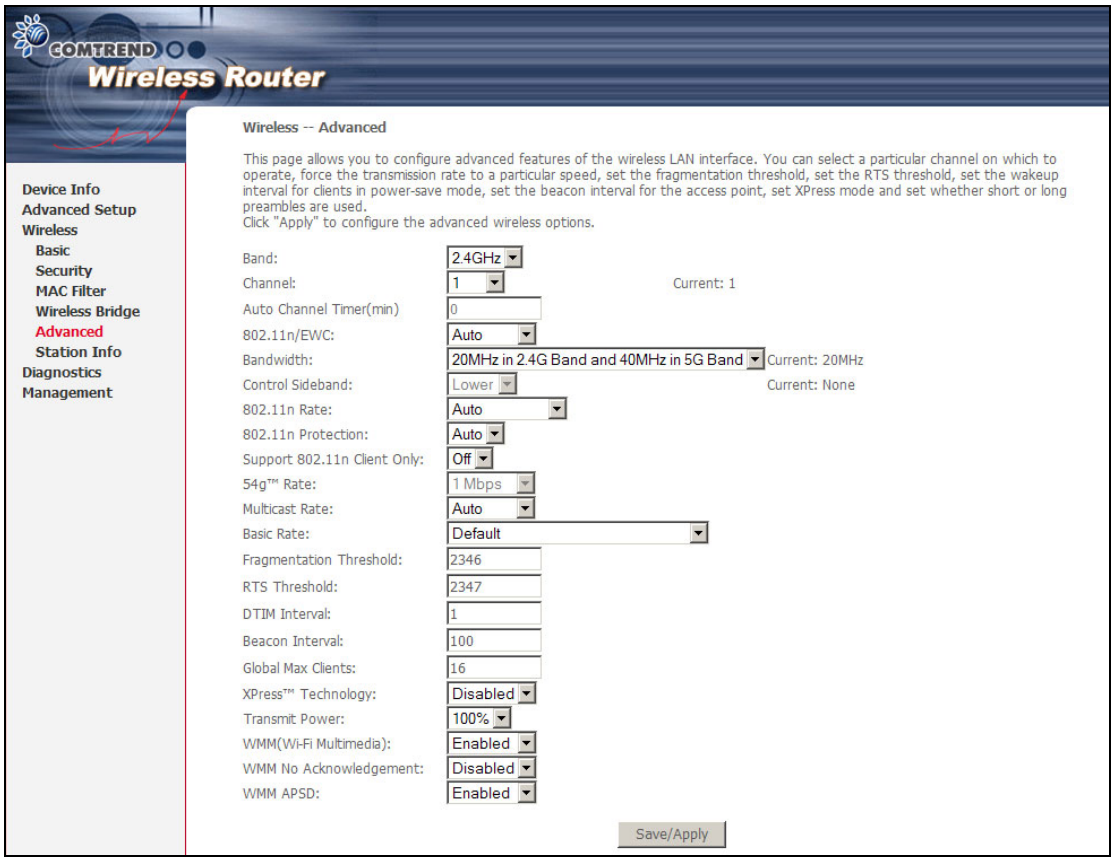

COMTREND
Wireless Router
Device Info
Advanced Setup
Wireless
Basic
Security
MAC Filter
Wireless Bridge
Advanced
Station Info
Diagnostics
Management
Wireless -- Bridge
This page allows you to configure wireless bridge features of the wireless LAN interface. You can select Wireless Bridge (also known as Wireless Distribution System) to disable access point functionality. Selecting Access Point enables access point functionality. Wireless bridge functionality will still be available and wireless stations will be able to associate to the AP. Select Disabled in Bridge Restrict which disables wireless bridge restriction. Any wireless bridge will be granted access. Selecting Enabled or Enabled(Scan) enables wireless bridge restriction. Only those bridges selected in Remote Bridges will be granted access.
Click "Refresh" to update the remote bridges. Wait for few seconds to update.
Click "Save/Apply" to configure the wireless bridge options.
AP Mode:
Access Point
Bridge Restrict:
Enabled
Remote Bridges MAC Address:
Refresh
Save/Apply

Click **Save/Apply** to implement new configuration settings.

Feature	Description
AP Mode	Selecting **Wireless Bridge** (aka Wireless Distribution System) disables Access Point (AP) functionality, while selecting **Access Point** enables AP functionality. In **Access Point** mode, wireless bridge functionality will still be available and wireless stations will be able to associate to the AP.
Bridge Restrict	Selecting **Disabled** disables wireless bridge restriction, which means that any wireless bridge will be granted access. Selecting **Enabled** or **Enabled (Scan)** enables wireless bridge restriction. Only those bridges selected in the Remote Bridges list will be granted access. Click **Refresh** to update the station list when Bridge Restrict is enabled.

6.5 Advanced

The Advanced screen allows you to configure advanced features of the wireless LAN interface. You can select a particular channel on which to operate, force the transmission rate to a particular speed, set the fragmentation threshold, set the RTS threshold, set the wakeup interval for clients in power-save mode, set the beacon interval for the access point, set XPress mode and set whether short or long preambles are used. Click **Save/Apply** to set new advanced wireless options.


COMTREND
Wireless Router
Device Info
Advanced Setup
Wireless
Basic
Security
MAC Filter
Wireless Bridge
Advanced
Station Info
Diagnostics
Management
Wireless -- Advanced
This page allows you to configure advanced features of the wireless LAN interface. You can select a particular channel on which to operate, force the transmission rate to a particular speed, set the fragmentation threshold, set the RTS threshold, set the wakeup interval for clients in power-save mode, set the beacon interval for the access point, set XPress mode and set whether short or long preambles are used.
Click "Apply" to configure the advanced wireless options.
Band: 2.4GHz
Channel: 1 Current: 1
Auto Channel Timer(min) 0
802.11n/EWC: Auto
Bandwidth: 20MHz in 2.4G Band and 40MHz in 5G Band Current: 20MHz
Control Sideband: Lower Current: None
802.11n Rate: Auto
802.11n Protection: Auto
Support 802.11n Client Only: Off
54g™ Rate: 1 Mbps
Multicast Rate: Auto
Basic Rate: Default
Fragmentation Threshold: 2346
RTS Threshold: 2347
DTIM Interval: 1
Beacon Interval: 100
Global Max Clients: 16
XPress™ Technology: Disabled
Transmit Power: 100%
WMM(Wi-Fi Multimedia): Enabled
WMM No Acknowledgement: Disabled
WMM APSD: Enabled
Save/Apply

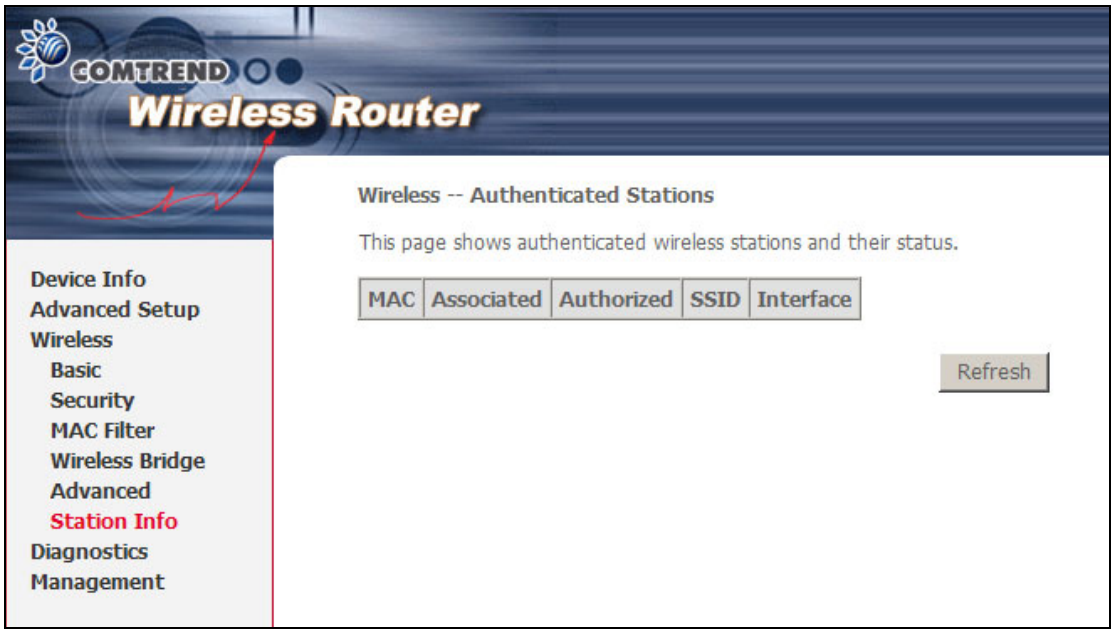
Field	Description
Band	Set to 2.4 GHz for compatibility with IEEE 802.11x standards. The new amendment allows IEEE 802.11n units to fall back to slower speeds so that legacy IEEE 802.11x devices can coexist in the same network. IEEE 802.11g creates data-rate parity at 2.4 GHz with the IEEE 802.11a standard, which has a 54 Mbps rate at 5 GHz. (IEEE 802.11a has other differences compared to IEEE 802.11b or g, such as offering more channels.)
Channel	Drop-down menu that allows selection of a specific channel.
Auto Channel Timer (min)	Auto channel scan timer in minutes (0 to disable)
802.11n/EWC	An equipment interoperability standard setting based on IEEE 802.11n Draft 2.0 and Enhanced Wireless Consortium (EWC)
Bandwidth	Select 20GHz or 40GHz bandwidth. 40GHz bandwidth uses two adjacent 20GHz bands for increased data throughput.
Control Sideband	Select Upper or Lower sideband when in 40GHz mode.

Field	Description
802.11n Rate	Set the physical transmission rate (PHY) from 6.5 to 130 Mbps.
802.11n Protection	Turn Off for maximized throughput. Turn On for greater security.
Support 802.11n Client Only	Turn Off to allow 802.11b/g clients access to the router. Turn On to prohibit 802.11b/g clients access to the router.
54g Rate	Drop-down menu that specifies the following fixed rates: Auto: Default. Uses the 11 Mbps data rate when possible but drops to lower rates when necessary. 1 Mbps, 2Mbps, 5.5Mbps, or 11Mbps fixed rates. The appropriate setting is dependent on signal strength.
Multicast Rate	Setting for multicast packet transmit rate (1-54 Mbps)
Basic Rate	Setting for basic transmission rate.
Fragmentation Threshold	A threshold, specified in bytes, that determines whether packets will be fragmented and at what size. On an 802.11 WLAN, packets that exceed the fragmentation threshold are fragmented, i.e., split into, smaller units suitable for the circuit size. Packets smaller than the specified fragmentation threshold value are not fragmented. Enter a value between 256 and 2346. If you experience a high packet error rate, try to slightly increase your Fragmentation Threshold. The value should remain at its default setting of 2346. Setting the Fragmentation Threshold too low may result in poor performance.
RTS Threshold	Request to Send, when set in bytes, specifies the packet size beyond which the WLAN Card invokes its RTS/CTS mechanism. Packets that exceed the specified RTS threshold trigger the RTS/CTS mechanism. The NIC transmits smaller packet without using RTS/CTS. The default setting of 2347 (maximum length) disables RTS Threshold.
DTIM Interval	Delivery Traffic Indication Message (DTIM) is also known as Beacon Rate. The entry range is a value between 1 and 65535. A DTIM is a countdown variable that informs clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. AP Clients hear the beacons and awaken to receive the broadcast and multicast messages. The default is 1.
Beacon Interval	The amount of time between beacon transmissions in milliseconds. The default is 100 ms and the acceptable range is 1 – 65535. The beacon transmissions identify the presence of an access point. By default, network devices passively scan all RF channels listening for beacons coming from access points. Before a station enters power save mode, the station needs the beacon interval to know when to wake up to receive the beacon (and learn whether there are buffered frames at the access point).
Global Max Clients	The maximum number of clients that can connect to the router.
Xpress ™ Technology	Xpress Technology is compliant with draft specifications of two planned wireless industry standards.

Field	Description
Transmit Power	Set the power output (by percentage) as desired.
WMM (Wi-Fi Multimedia)	The technology maintains the priority of audio, video and voice applications in a Wi-Fi network. It allows multimedia service get higher priority.
WMM No Acknowledgement	Refers to the acknowledge policy used at the MAC level. Enabling no Acknowledgement can result in more efficient throughput but higher error rates in a noisy Radio Frequency (RF) environment.
WMM APSD	This is Automatic Power Save Delivery. It saves power.

6.6 Station Info

This page shows authenticated wireless stations and their status. Click the **Refresh** button to update the list of stations in the WLAN.



Consult the table below for descriptions of each column heading.

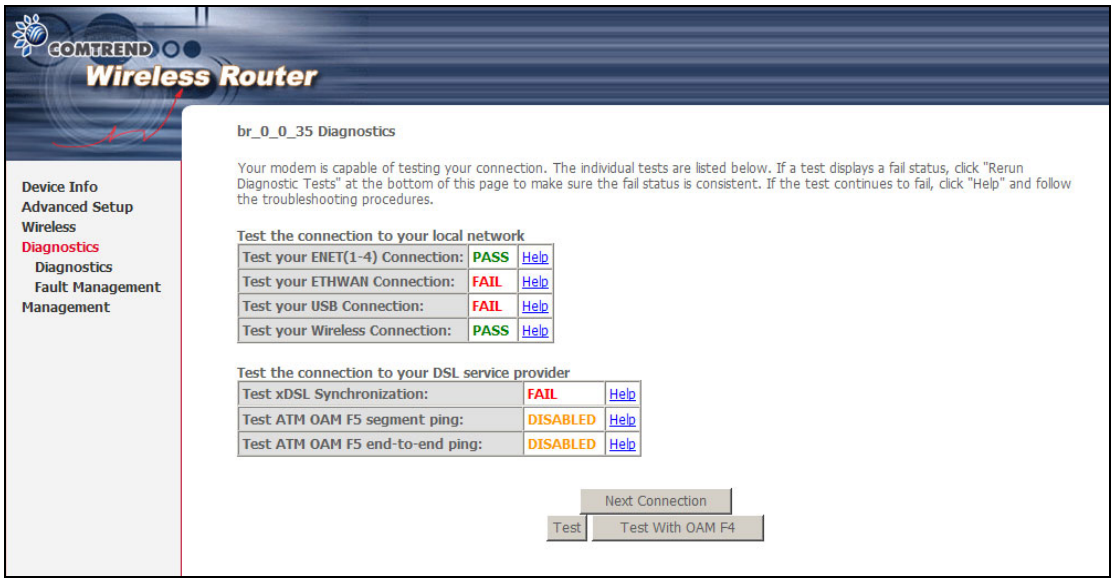
Heading	Description
MAC	Lists the MAC address of all the stations.
Associated	Lists all the stations that are associated with the Access Point, along with the amount of time since packets were transferred to and from each station. If a station is idle for too long, it is removed from this list.
Authorized	Lists those devices with authorized access.
SSID	Lists which SSID of the modem that the stations connect to.
Interface	Lists which interface of the modem that the stations connect to.

Chapter 7 Diagnostics

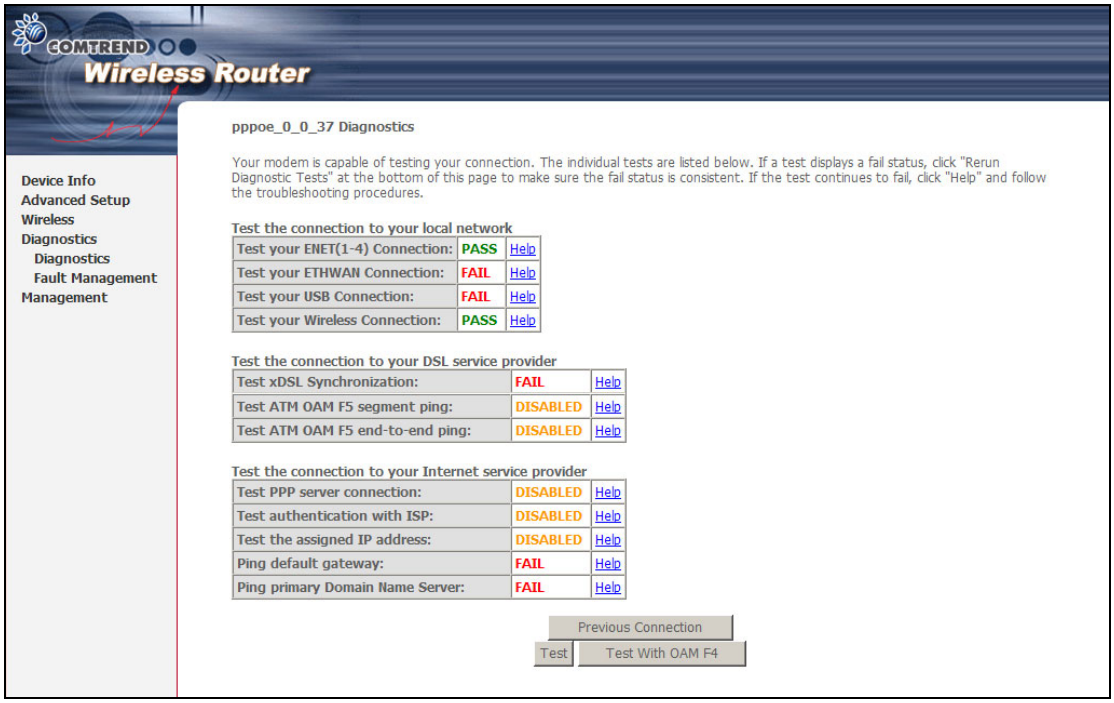
7.1 Diagnostics

Diagnostics screens for ATM Bridge and PPPoE connection types are shown below.

Bridge Connection


COMTREND
Wireless Router
Device Info
Advanced Setup
Wireless
Diagnostics
Diagnostics
Fault Management
Management
br_0_0_35 Diagnostics
Your modem is capable of testing your connection. The individual tests are listed below. If a test displays a fail status, click "Rerun Diagnostic Tests" at the bottom of this page to make sure the fail status is consistent. If the test continues to fail, click "Help" and follow the troubleshooting procedures.
Test the connection to your local network
Test your ENET(1-4) Connection: PASS Help
Test your ETHWAN Connection: FAIL Help
Test your USB Connection: FAIL Help
Test your Wireless Connection: PASS Help
Test the connection to your DSL service provider
Test xDSL Synchronization: FAIL Help
Test ATM OAM F5 segment ping: DISABLED Help
Test ATM OAM F5 end-to-end ping: DISABLED Help
Next Connection
Test
Test With OAM F4

PPPoE Connection


COMTREND
Wireless Router
Device Info
Advanced Setup
Wireless
Diagnostics
Diagnostics
Fault Management
Management
pppoe_0_0_37 Diagnostics
Your modem is capable of testing your connection. The individual tests are listed below. If a test displays a fail status, click "Rerun Diagnostic Tests" at the bottom of this page to make sure the fail status is consistent. If the test continues to fail, click "Help" and follow the troubleshooting procedures.
Test the connection to your local network
Test your ENET(1-4) Connection: PASS Help
Test your ETHWAN Connection: FAIL Help
Test your USB Connection: FAIL Help
Test your Wireless Connection: PASS Help
Test the connection to your DSL service provider
Test xDSL Synchronization: FAIL Help
Test ATM OAM F5 segment ping: DISABLED Help
Test ATM OAM F5 end-to-end ping: DISABLED Help
Test the connection to your Internet service provider
Test PPP server connection: DISABLED Help
Test authentication with ISP: DISABLED Help
Test the assigned IP address: DISABLED Help
Ping default gateway: FAIL Help
Ping primary Domain Name Server: FAIL Help
Previous Connection
Test
Test With OAM F4

The Diagnostics menu provides feedback on the connection status of the CT-5364A. If a test displays a fail status, click the **Test** button to retest and confirm the error. If the test continues to fail, click Help and follow the troubleshooting procedures provided.

Chapter 8 Management

The Management menu has the following maintenance functions and processes:

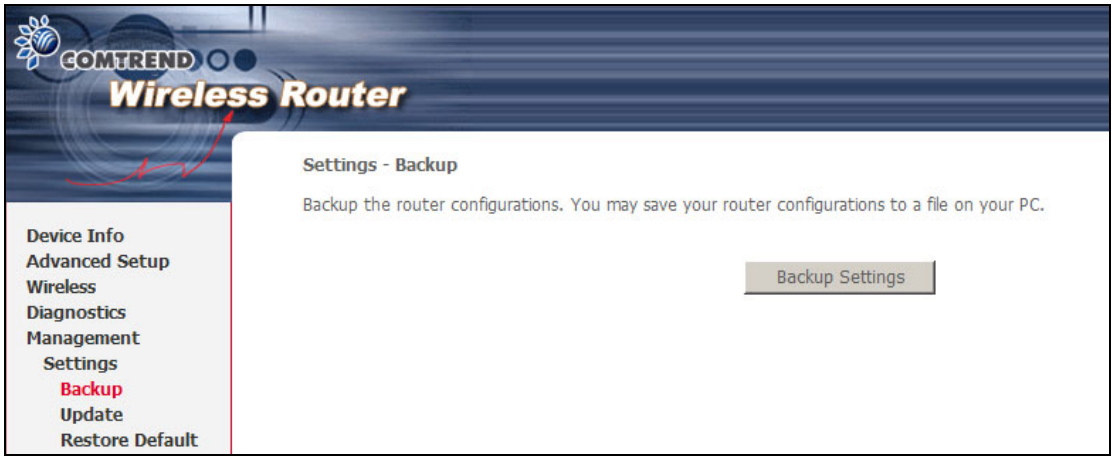
8.1 Settings	8.2 System Log
8.3 TR-069 Client	8.4 Internet Time
8.5 Access Control	8.6 Update Software
8.7 Reboot	

8.1 Settings

This includes Backup Settings, Update Settings, and Restore Default screens.

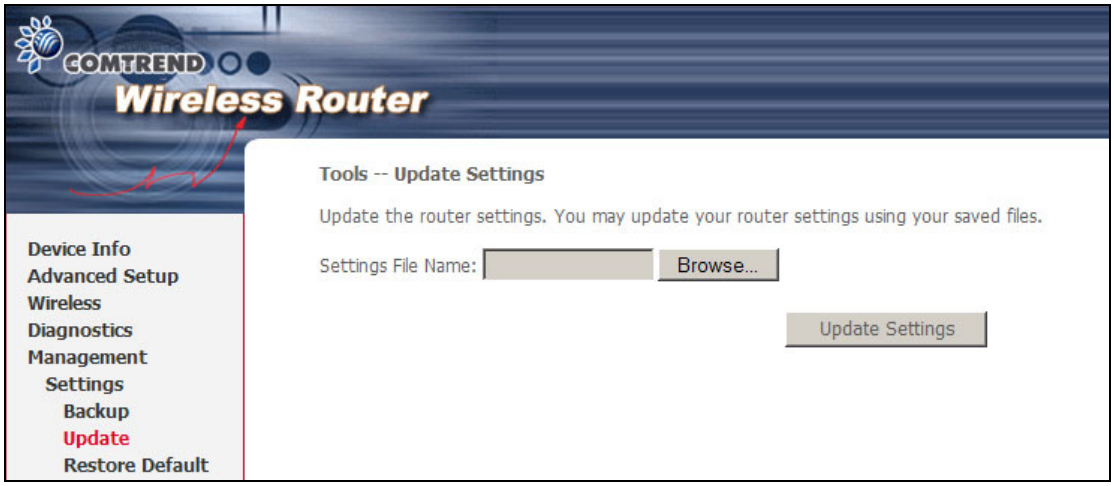
8.1.1 Backup Settings

To save the current configuration to a file on your PC, click **Backup Settings**. You will be prompted for a location of the backup file. This file can later be used to recover settings using the **Update Settings** function described below.



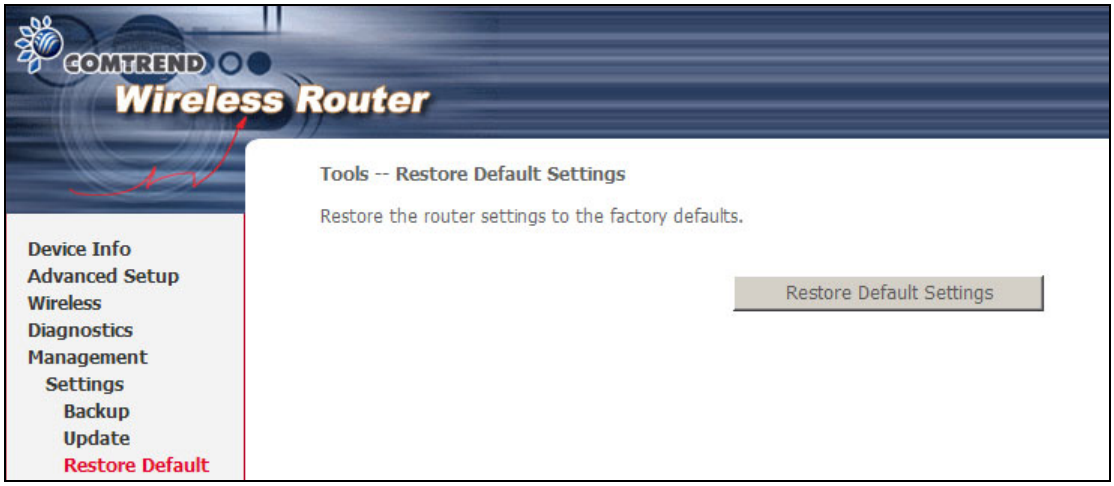
8.1.2 Update Settings

This option recovers configuration files previously saved using **Backup Settings**. Enter the file name (including folder path) in the **Settings File Name** box or press **Browse…** to search for the file. Click **Update Settings** to recover settings.

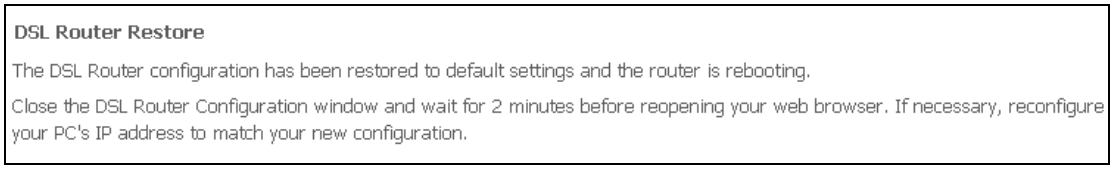


8.1.3 Restore Default

Click **Restore Default Settings** to restore factory default settings.



After **Restore Default Settings** is clicked, the following screen appears.


DSL Router Restore
The DSL Router configuration has been restored to default settings and the router is rebooting.
Close the DSL Router Configuration window and wait for 2 minutes before reopening your web browser. If necessary, reconfigure your PC's IP address to match your new configuration.

Close the browser and wait for 2 minutes before reopening it. It may also be necessary, to reconfigure your PC IP configuration to match your new settings.

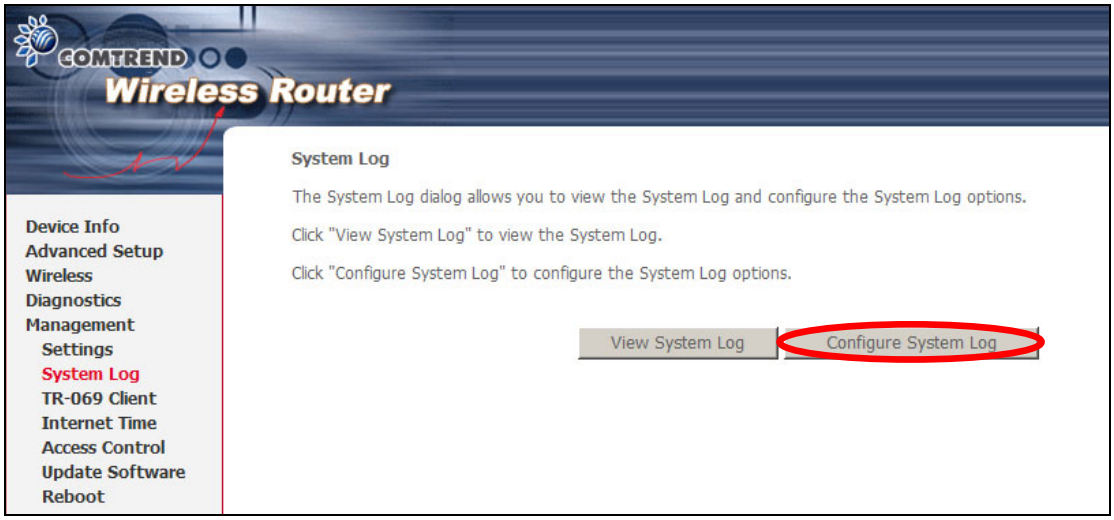
NOTE:	This entry has the same effect as the **Reset** button. The CT-5364A board hardware and the boot loader support the reset to default. If the **Reset** button is continuously pressed for more than 5 seconds, the boot loader will erase the configuration data saved in flash memory.

8.2 System Log

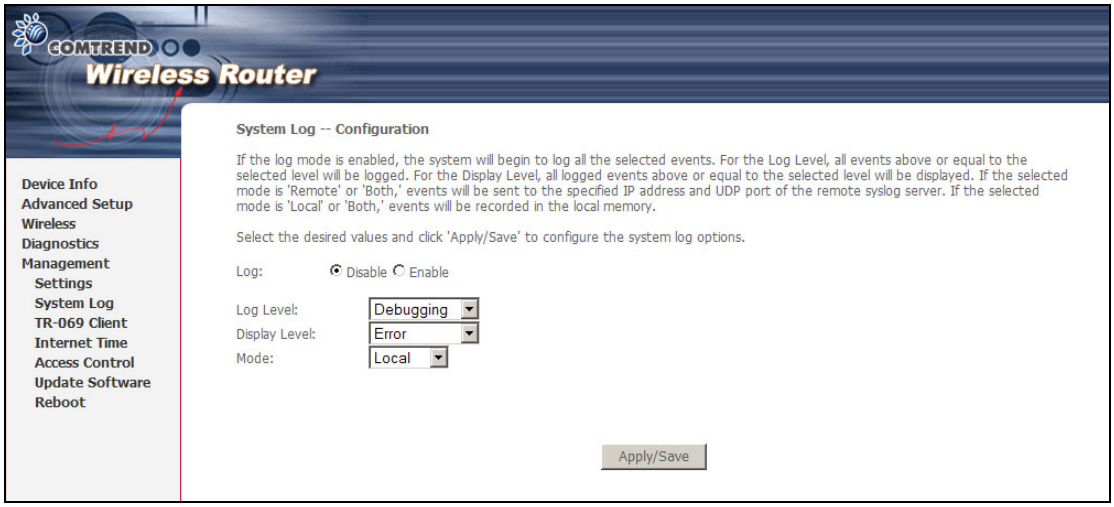
This function allows a system log to be kept and viewed upon request.

Follow the steps below to configure, enable, and view the system log.

STEP 1: Click **Configure System Log**, as shown below (circled in **Red**).



STEP 2: Select desired options and click **Apply/Save**.

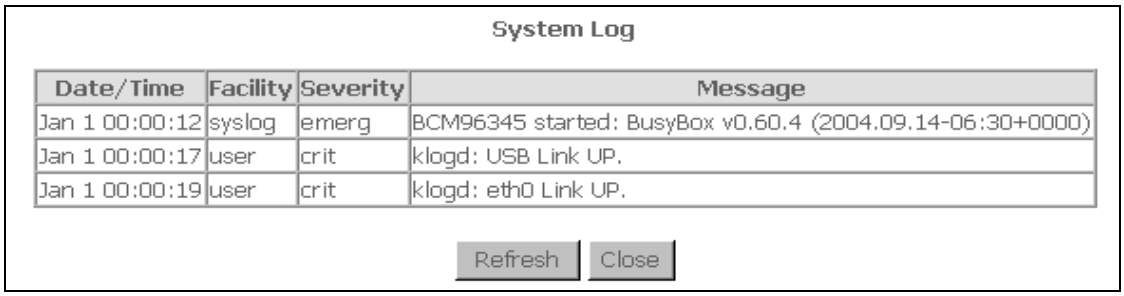

COMTREND
Wireless Router
Device Info
Advanced Setup
Wireless
Diagnostics
Management
Settings
System Log
TR-069 Client
Internet Time
Access Control
Update Software
Reboot
System Log -- Configuration
If the log mode is enabled, the system will begin to log all the selected events. For the Log Level, all events above or equal to the selected level will be logged. For the Display Level, all logged events above or equal to the selected level will be displayed. If the selected mode is 'Remote' or 'Both,' events will be sent to the specified IP address and UDP port of the remote syslog server. If the selected mode is 'Local' or 'Both,' events will be recorded in the local memory.
Select the desired values and click 'Apply/Save' to configure the system log options.
Log: Disable Enable
Log Level: Debugging
Display Level: Error
Mode: Local
Apply/Save

Consult the table below for detailed descriptions of each system log option.

Option	Description
Log	Indicates whether the system is currently recording events. The user can enable or disable event logging. By default, it is disabled. To enable it, select the **Enable** radio button and then click **Apply/Save**.

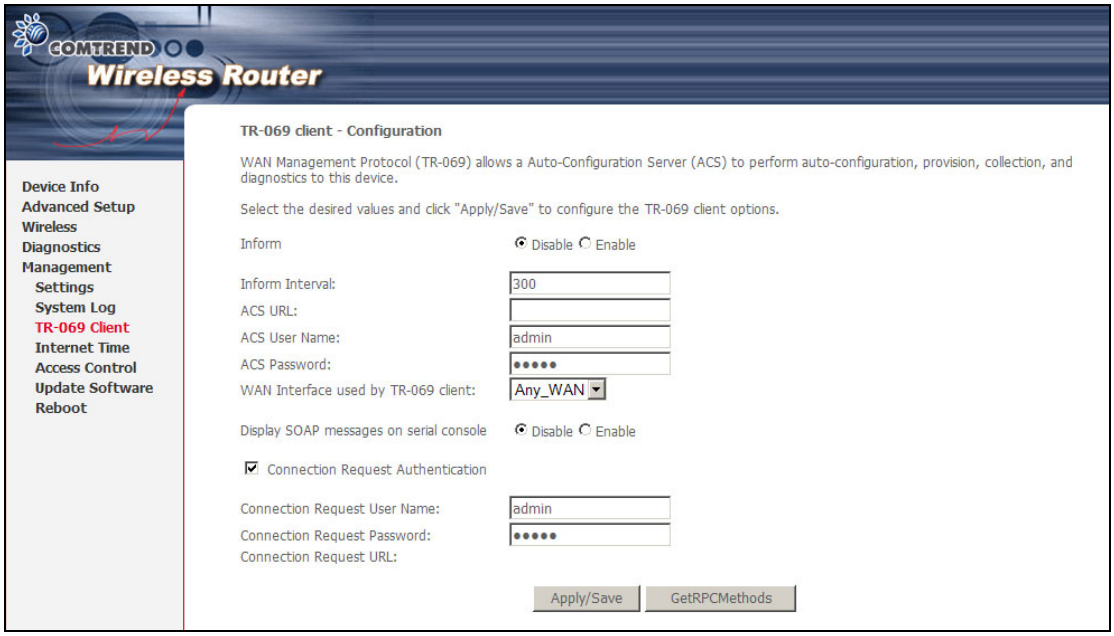
Option	Description
Log Level	Allows you to configure the event level and filter out unwanted events below this level. The events ranging from the highest critical level "Emergency" down to this configured level will be recorded to the log buffer on the CT-5364A SDRAM. When the log buffer is full, the newer event will wrap up to the top of the log buffer and overwrite the old event. By default, the log level is "Debugging", which is the lowest critical level. The log levels are defined as follows: • Emergency = system is unusable • Alert = action must be taken immediately • Critical = critical conditions • Error = Error conditions • Warning = normal but significant condition • Notice= normal but insignificant condition • Informational= provides information for reference • Debugging = debug-level messages Emergency is the most serious event level, whereas Debugging is the least important. For instance, if the log level is set to Debugging, all the events from the lowest Debugging level to the most critical level Emergency level will be recorded. If the log level is set to Error, only Error and the level above will be logged.
Display Level	Allows the user to select the logged events and displays on the **View System Log** window for events of this level and above to the highest Emergency level.
Mode	Allows you to specify whether events should be stored in the local memory, or be sent to a remote system log server, or both simultaneously. If remote mode is selected, view system log will not be able to display events saved in the remote system log server. When either Remote mode or Both mode is configured, the WEB UI will prompt the user to enter the Server IP address and Server UDP port.

STEP 3: Click **View System Log**. The results are displayed as follows.



8.3 TR-069 Client

WAN Management Protocol (TR-069) allows an Auto-Configuration Server (ACS) to perform auto-configuration, provision, collection, and diagnostics to this device. Select desired values and click **Apply/Save** to configure TR-069 client options.



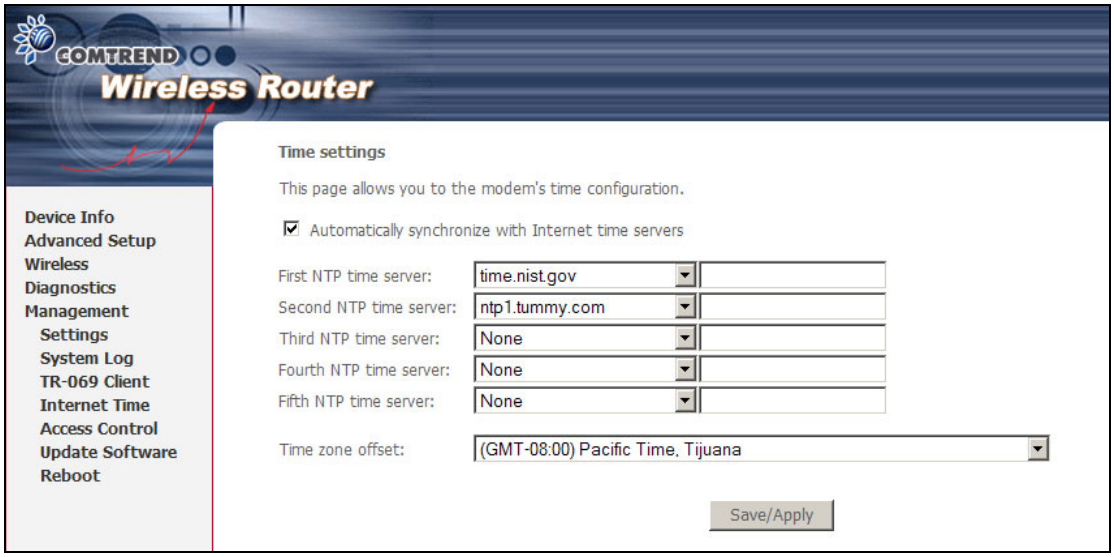
The table below is provided for ease of reference.

Option	Description
Inform	Disable/Enable TR-069 client on the CPE.
Inform Interval	The duration in seconds of the interval for which the CPE MUST attempt to connect with the ACS and call the Inform method.
ACS URL	URL for the CPE to connect to the ACS using the CPE WAN Management Protocol. This parameter MUST be in the form of a valid HTTP or HTTPS URL. An HTTPS URL indicates that the ACS supports SSL. The "host" portion of this URL is used by the CPE for validating the certificate from the ACS when using certificate-based authentication.
ACS User Name	Username used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol. This username is used only for HTTP-based authentication of the CPE.
ACS Password	Password used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol. This password is used only for HTTP-based authentication of the CPE.
WAN Interface used by TR-069 client	Choose Any_WAN, LAN, Loopback or a configured connection.
Display SOAP messages on serial console	Enable/Disable SOAP messages on serial console. This option is used for advanced troubleshooting of the device.
Connection Request	
Authorization	Tick the checkbox ☑ to enable.
User Name	Username used to authenticate an ACS making a Connection Request to the CPE.
Password	Password used to authenticate an ACS making a Connection Request to the CPE.
URL	WAN IP address and port the ACS uses to connect to CT-5364A.

The **Get RPC Methods** button forces the CPE to establish an immediate connection to the ACS. This may be used to discover the set of methods supported by the ACS or CPE. This list may include both standard TR-069 methods (those defined in this specification or a subsequent version) and vendor-specific methods. The receiver of the response MUST ignore any unrecognized methods.

8.4 Internet Time

This option automatically synchronizes the router time with Internet timeservers. To enable time synchronization, tick the corresponding checkbox ☑, choose your preferred time server(s), select the correct time zone offset, and click **Save/Apply**.



NOTE:	Internet Time must be activated to use Parental Control (page 37). In addition, this menu item is not displayed when in Bridge mode since the router would not be able to connect to the NTP timeserver.

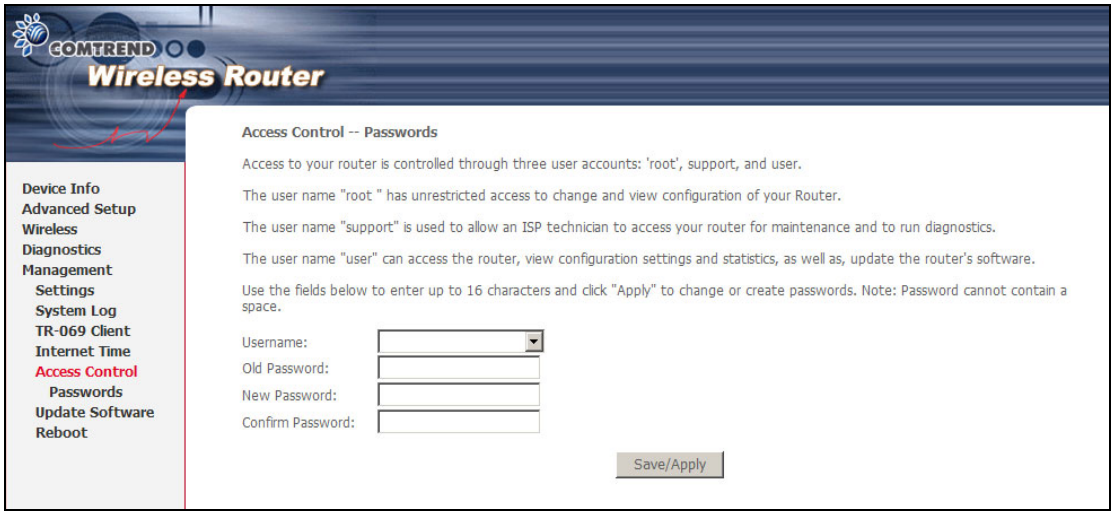
8.5 Access Control

8.5.1 Passwords

This screen is used to configure the user account access passwords for the device. Access to the CT-5364A is controlled through the following three user accounts:

- **root** - has unrestricted access to change and view the configuration.
- **support** - is used for remote maintenance and diagnostics of the router
- **user** - has limited access. This account can view configuration settings and statistics, as well as, update the router firmware.

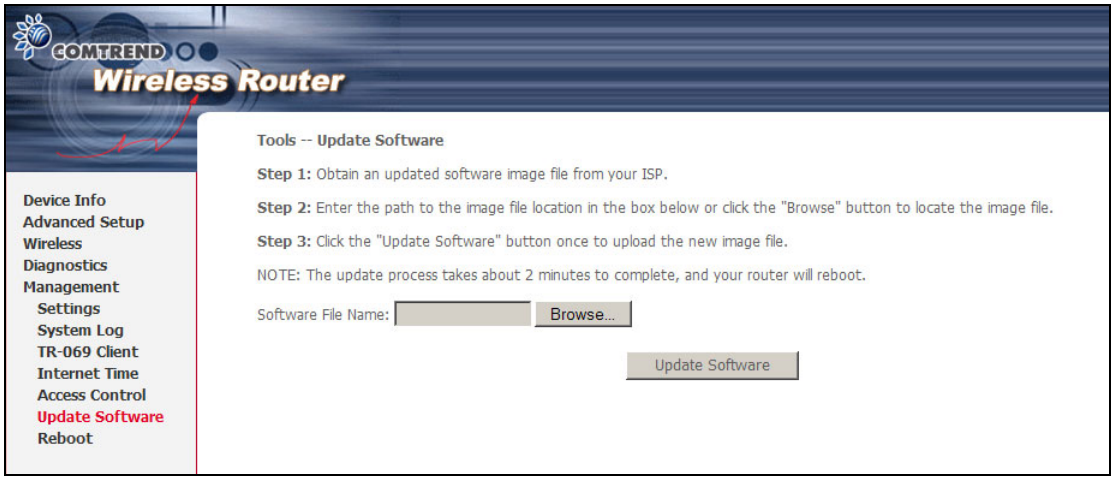
Use the fields below to change password settings. Click **Save/Apply** to continue.


COMTREND
Wireless Router
Device Info
Advanced Setup
Wireless
Diagnostics
Management
Settings
System Log
TR-069 Client
Internet Time
Access Control
Passwords
Update Software
Reboot
Access Control -- Passwords
Access to your router is controlled through three user accounts: 'root', support, and user.
The user name "root " has unrestricted access to change and view configuration of your Router.
The user name "support" is used to allow an ISP technician to access your router for maintenance and to run diagnostics.
The user name "user" can access the router, view configuration settings and statistics, as well as, update the router's software.
Use the fields below to enter up to 16 characters and click "Apply" to change or create passwords. Note: Password cannot contain a space.
Username:
Old Password:
New Password:
Confirm Password:
Save/Apply

NOTE: Passwords can be up to 16 characters in length.

8.6 Update Software

This option allows for firmware upgrades from a locally stored file.


COMTREND
Wireless Router
Device Info
Advanced Setup
Wireless
Diagnostics
Management
Settings
System Log
TR-069 Client
Internet Time
Access Control
Update Software
Reboot
Tools -- Update Software
Step 1: Obtain an updated software image file from your ISP.
Step 2: Enter the path to the image file location in the box below or click the "Browse" button to locate the image file.
Step 3: Click the "Update Software" button once to upload the new image file.
NOTE: The update process takes about 2 minutes to complete, and your router will reboot.
Software File Name:
Browse...
Update Software

STEP 1: Obtain an updated software image file from your ISP.

STEP 2: Enter the path and filename of the firmware image file in the **Software File Name** field or click the Browse button to locate the image file.

STEP 3: Click the **Update Software** button once to upload and install the file.

NOTE:	The update process will take about 2 minutes to complete. The device will reboot and the browser window will refresh to the default screen upon successful installation. It is recommended that you compare the **Software Version** on the Device Information screen with the firmware version installed, to confirm the installation was successful.

8.7 Reboot

To save the current configuration and reboot the router, click **Save/Reboot**.

NOTE: You may need to close the browser window and wait for 2 minutes before reopening it. It may also be necessary, to reset your PC IP configuration.

Appendix A - Firewall

STATEFUL PACKET INSPECTION
Refers to an architecture, where the firewall keeps track of packets on each connection traversing all its interfaces and makes sure they are valid. This is in contrast to static packet filtering which only examines a packet based on the information in the packet header.

DENIAL OF SERVICE ATTACK
Is an incident in which a user or organization is deprived of the services of a resource they would normally expect to have. Various DoS attacks the device can withstand are ARP Attack, Ping Attack, Ping of Death, Land, SYN Attack, Smurf Attack, and Tear Drop.

TCP/IP/PORT/INTERFACE FILTER
These rules help in the filtering of traffic at the Network layer (i.e. Layer 3). When a Routing interface is created, **Enable Firewall** must be checked. Navigate to Advanced Setup → Security → IP Filtering.

OUTGOING IP FILTER
Helps in setting rules to DROP packets from the LAN interface. By default, if the Firewall is Enabled, all IP traffic from the LAN is allowed. By setting up one or more filters, specific packet types coming from the LAN can be dropped.

Example 1:	Filter Name	: Out_Filter1
	Protocol	: TCP
	Source IP address	: 192.168.1.45
	Source Subnet Mask	: 255.255.255.0
	Source Port	: 80
	Dest. IP Address	: NA
	Dest. Subnet Mask	: NA
	Dest. Port	: NA

This filter will Drop all TCP packets coming from the LAN with IP Address/Subnet Mask of 192.168.1.45/24 having a source port of 80 irrespective of the destination. All other packets will be Accepted.

Example 2:	Filter Name	: Out_Filter2
	Protocol	: UDP
	Source IP Address	: 192.168.1.45
	Source Subnet Mask	: 255.255.255.0
	Source Port	: 5060:6060
	Dest. IP Address	: 172.16.13.4
	Dest. Subnet Mask	: 255.255.255.0
	Dest. Port	: 6060:7070

This filter will drop all UDP packets coming from the LAN with IP Address / Subnet Mask of 192.168.1.45/24 and a source port range of 5060 to 6060, destined to 172.16.13.4/24 and a destination port range of 6060 to 7070.

INCOMING IP FILTER
Helps in setting rules to Allow or Deny packets from the WAN interface. By default, all incoming IP traffic from the WAN is Blocked, if the Firewall is Enabled. By setting up one or more filters, specific packet types coming from the WAN can be Accepted.

Example 1:

Filter Name	: In_Filter1
Protocol	: TCP
Policy	: Allow
Source IP Address	: 210.168.219.45
Source Subnet Mask	: 255.255.0.0
Source Port	: 80
Dest. IP Address	: NA
Dest. Subnet Mask	: NA
Dest. Port	: NA
Selected WAN interface	: br0

This filter will ACCEPT all TCP packets coming from WAN interface "br0" with IP Address/Subnet Mask 210.168.219.45/16 with a source port of 80, irrespective of the destination. All other incoming packets on this interface are DROPPED.

Example 2:

Filter Name	: In_Filter2
Protocol	: UDP
Policy	: Allow
Source IP Address	: 210.168.219.45
Source Subnet Mask	: 255.255.0.0
Source Port	: 5060:6060
Dest. IP Address	: 192.168.1.45
Dest. Sub. Mask	: 255.255.255.0
Dest. Port	: 6060:7070
Selected WAN interface	: br0

This rule will ACCEPT all UDP packets coming from WAN interface "br0" with IP Address/Subnet Mask 210.168.219.45/16 and a source port in the range of 5060 to 6060, destined to 192.168.1.45/24 and a destination port in the range of 6060 to 7070. All other incoming packets on this interface are DROPPED.

MAC LAYER FILTER

These rules help in the filtering of Layer 2 traffic. MAC Filtering is only effective in Bridge mode. After a Bridge mode connection is created, navigate to Advanced Setup → Security → MAC Filtering in the WUI.

Example 1:

Global Policy	: Forwarded
Protocol Type	: PPPoE
Dest. MAC Address	: 00:12:34:56:78:90
Source MAC Address	: NA
Src. Interface	: eth1
Dest. Interface	: eth2

Addition of this rule drops all PPPoE frames going from eth1 to eth2 with a Destination MAC Address of 00:12:34:56:78:90 irrespective of its Source MAC Address. All other frames on this interface are forwarded.

Example 2:

Global Policy	: Blocked
Protocol Type	: PPPoE
Dest. MAC Address	: 00:12:34:56:78:90
Source MAC Address	: 00:34:12:78:90:56
Src. Interface	: eth1
Dest. Interface	: eth2

Addition of this rule forwards all PPPoE frames going from eth1 to eth2 with a Destination MAC Address of 00:12:34:56:78 and Source MAC Address of 00:34:12:78:90:56. All other frames on this interface are dropped.

DAYTIME PARENTAL CONTROL

This feature restricts access of a selected LAN device to an outside Network through the CT-5364A, as per chosen days of the week and the chosen times.

Example:		
	User Name	: FilterJohn
	Browser's MAC Address	: 00:25:46:78:63:21
	Days of the Week	: Mon, Wed, Fri
	Start Blocking Time	: 14:00
	End Blocking Time	: 18:00

With this rule, a LAN device with MAC Address of 00:25:46:78:63:21 will have no access to the WAN on Mondays, Wednesdays, and Fridays, from 2pm to 6pm. On all other days and times, this device will have access to the outside Network.

Appendix B - Pin Assignments

ETHERNET Ports (RJ45)

Pin	Definition	Pin	Definition
1	Transmit data+	5	NC
2	Transmit data-	6	Receive data-
3	Receive data+	7	NC
4	NC	8	NC

Appendix C - Specifications

Hardware Interface

RJ-11 X 1 for ADSL, RJ-45 X 1 for ETH WAN, RJ-45 X 4 for LAN, USB Host, Power Switch X 1, Reset Button X 1, WPS X 1, Wi-Fi Antenna X 2

WAN Interface

ADSL standard ITU-T G.992.5, ITU-T G.992.3, ITU-T G.992.1, ANSI T1.413 Issue 2

G.992.5 (ADSL2+)	Downstream : 24 Mbps	Upstream : 1.3 Mbps
G.992.3 (ADSL2)	Downstream : 12 Mbps	Upstream : 1.3 Mbps
G.DMT	Downstream : 8 Mbps	Upstream : 0.8 Mbps

LAN Interface

Standard..... IEEE 802.3, IEEE 802.3u
10/100 BaseT ..... Auto-sense
MDI/MDX support..... Yes

WLAN Interface

Standard ..... IEEE 802.11n (IEEE 802.11b/g compatible)
Encryption..... 64/128-bit Wired Equivalent Privacy (WEP)
Channels..... 11 (US, Canada)/ 13 (Europe)/ 14 (Japan)
Data Rate ..... Up to 270Mbps
WPA/WPA2..... Yes
IEEE 802.1x ..... Yes
WDS ..... Yes
WMM..... Yes
WPS..... Yes
MAC Filtering ..... Yes
Optional..... Afterburner mode (Turbo mode)***

ATM Attributes

RFC 2364 (PPPoA), RFC 2684 (RFC 1483) bridge/route; RFC 2516 (PPPoE); RFC 1577 (IPoA)
Support PVCs 16
AAL type..... AAL5
ATM service class ..... UBR/CBR/VBR
ATM UNI support..... UNI3.1/4.0
OAM F4/F5 ..... Yes

Management

Compliant with TR-069/TR-098/TR-111 remote management protocols, Telnet, Web-based management, Configuration backup and restoration, Software upgrade via HTTP / TFTP / FTP server.

Bridge Functions

Transparent bridging and learning..... IEEE 802.1d
VLAN support ..... Yes
Spanning tree algorithm..... Yes
IGMP Snooping ..... Yes

Routing Functions

PPPoE, IPoA, Static route, RIP v1/v2, NAT/PAT, DMZ, DHCP Server/Relay/Client, DNS Proxy, ARP, IGMP Proxy

Security Functions

Authentication protocol： PAP, CHAP
TCP/IP/Port filtering rules, Port Triggering/Forwarding, Packet and MAC address filtering, Access Control, DoS Protection, SSH

Application Passthrough

PPTP, L2TP, VoIP, Yahoo messenger, ICQ, RealPlayer, NetMeeting, MSN, X-box

QoS.....L3 policy-based QoS, IP QoS, ToS

Power Supply.....Input: 220 - 230 Vac
Output: 15 Vdc / 0.8 A

Environment Condition

Operating temperature.....0 ~ 50 degrees Celsius
Relative humidity .....5 ~ 95% (non-condensing)

Dimensions..... 205 mm (W) x 48 mm (H) x 145 mm (D)

Kit Weight

(1*CT-5364A, 1*RJ11 cable, 1*RJ45 cable, 1*power adapter, 1*CD-ROM) = 0.9 kg

Certifications ..... CE, FCC

NOTE: Specifications are subject to change without notice

Appendix D - SSH Client

Unlike Microsoft Windows, Linux OS has a ssh client included. For Windows users, there is a public domain one called "putty" that can be downloaded from here:

http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

To access the ssh client you must first enable SSH access for the LAN or WAN from the Management → Access Control → Services menu in the web user interface.

To access the router using the Linux ssh client

For LAN access, type: ssh -l root 192.168.1.1

For WAN access, type: ssh -l support *WAN IP address*

To access the router using the Windows "putty" ssh client

For LAN access, type: putty -ssh -l root 192.168.1.1

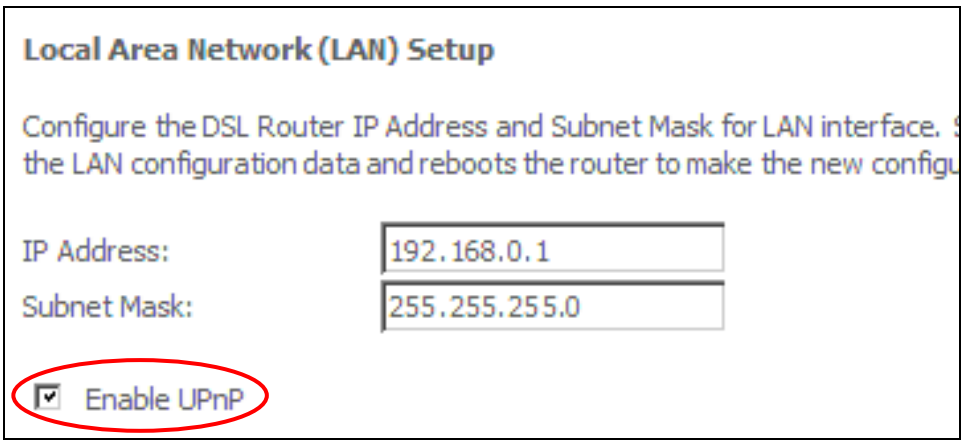
For WAN access, type: putty -ssh -l support *WAN IP address*

NOTE: The *WAN IP address* can be found on the Device Info → WAN screen

Appendix E - WSC External Registrar

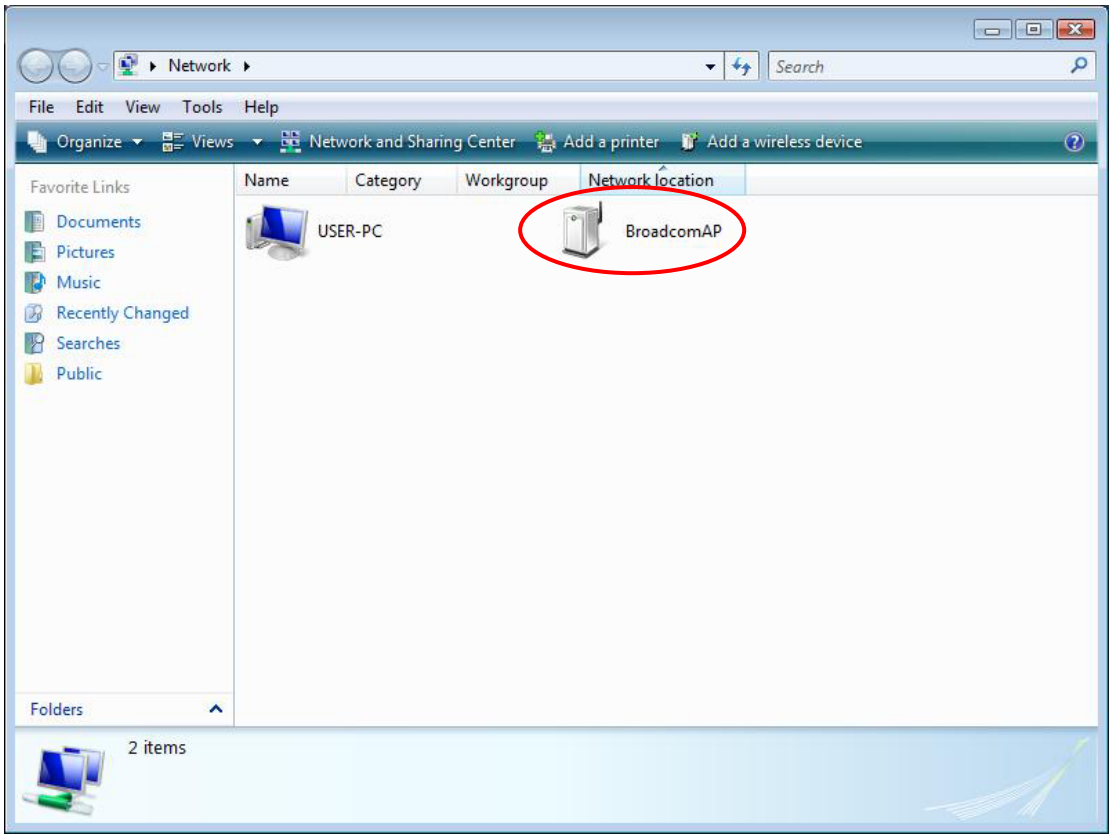
Follow these steps to add an external registrar using the web user interface (WUI) on a personal computer running the Windows Vista operating system:

Step 1: Enable UPnP on the Advanced Setup → LAN screen in the WUI.

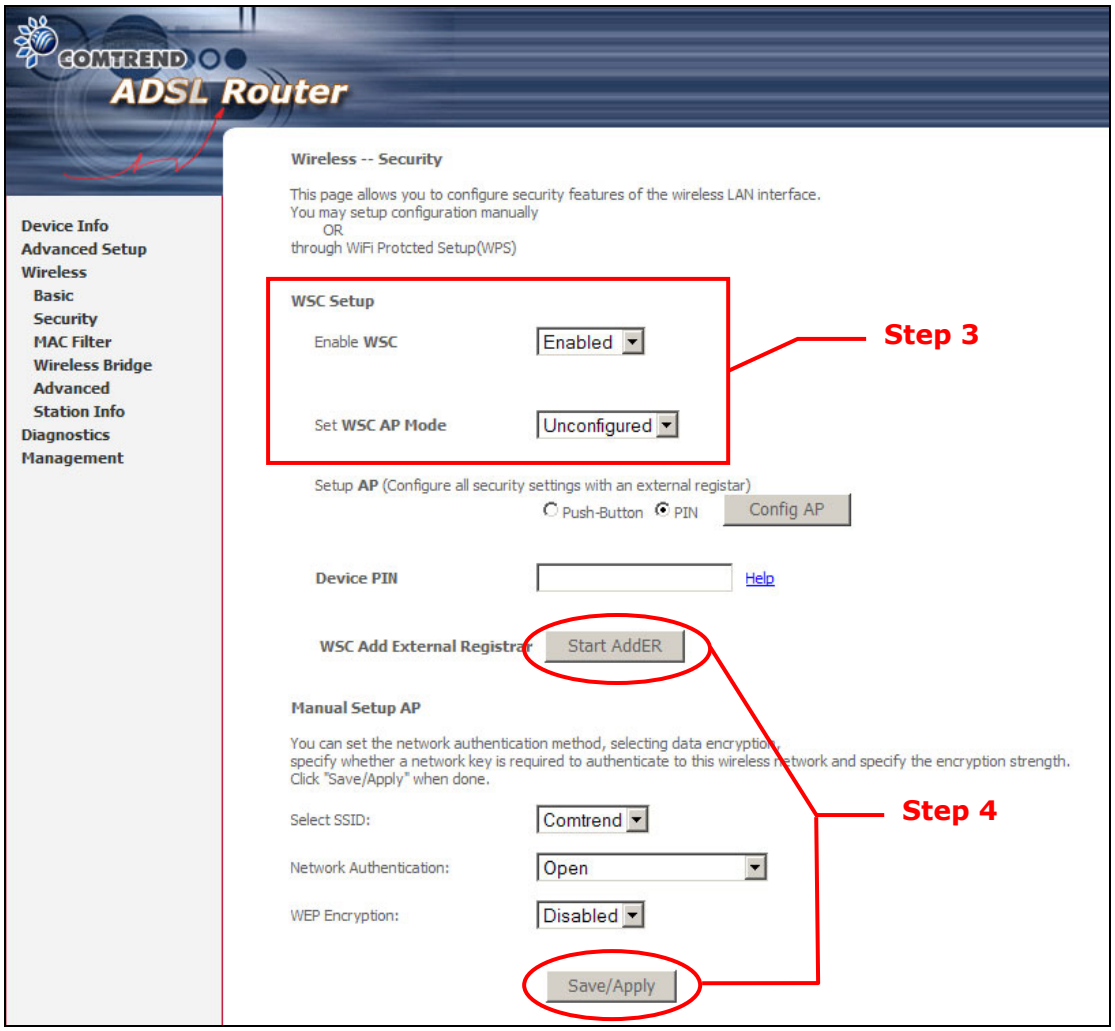

Local Area Network (LAN) Setup
Configure the DSL Router IP Address and Subnet Mask for LAN interface.
the LAN configuration data and reboots the router to make the new config
IP Address:
192.168.0.1
Subnet Mask:
255.255.255.0
Enable UPnP

NOTE: A PVC must exist to see this option.

Step 2: Open the Network folder and look for the BroadcomAP icon.

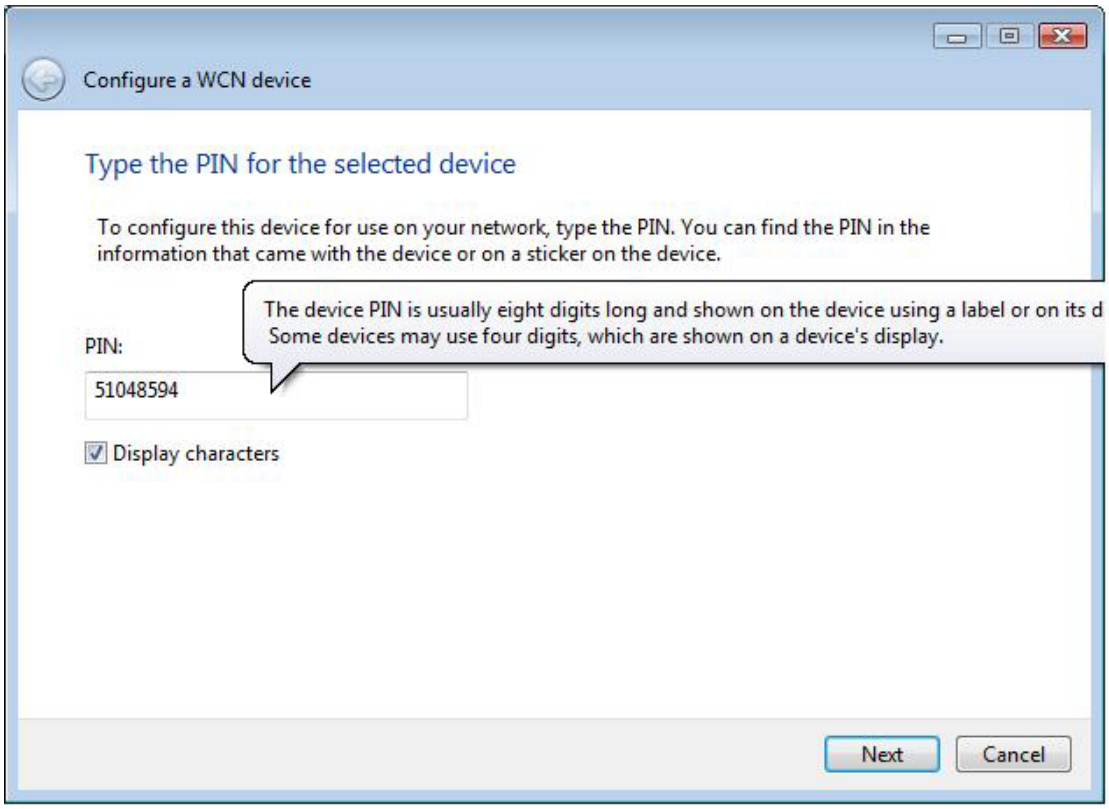


Step 3: On the Wireless → Security screen, enable WSC by selecting **Enabled** from the drop down list box and set the WSC AP Mode to Unconfigured.

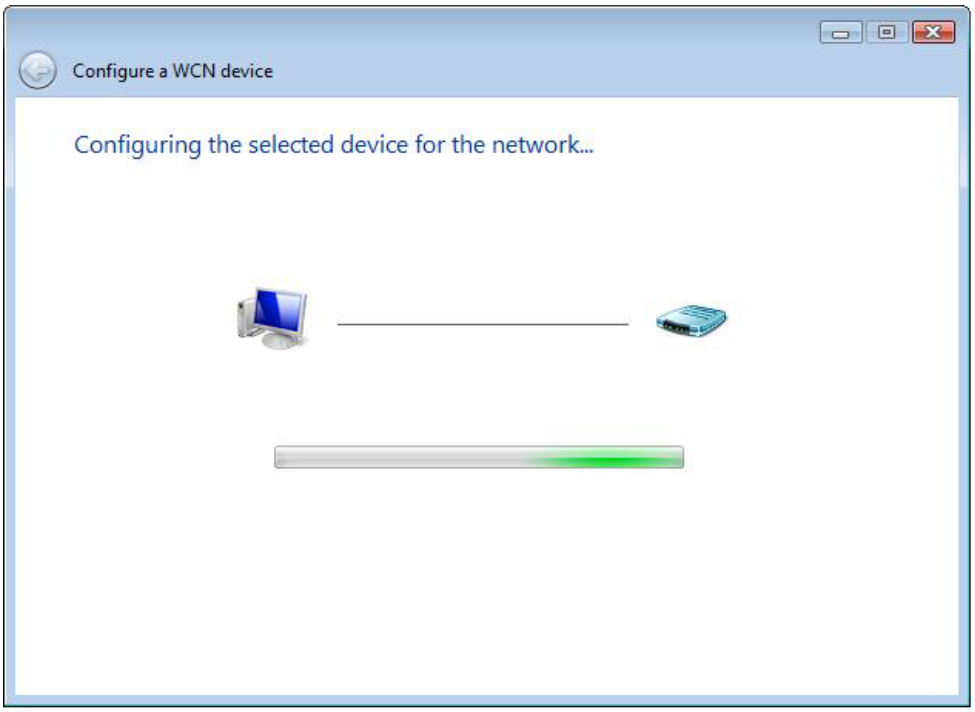


Step 4: Click the **Save/Apply** button at the bottom of the screen. The screen will go blank while the router applies the new Wireless settings. When the screen returns, press the **Start AddER** button, as shown above.

Step 5: Now return to the Network folder and click the BroadcomAP icon. A dialog box will appear asking for the Device PIN number. Enter the Device PIN as shown on the Wireless → Security screen. Click **Next**.


Configure a WCN device
Type the PIN for the selected device
To configure this device for use on your network, type the PIN. You can find the PIN in the information that came with the device or on a sticker on the device.
The device PIN is usually eight digits long and shown on the device using a label or on its d
Some devices may use four digits, which are shown on a device's display.
PIN:
51048594
Display characters
Next
Cancel

Step 6: Windows Vista will attempt to configure the wireless security settings.



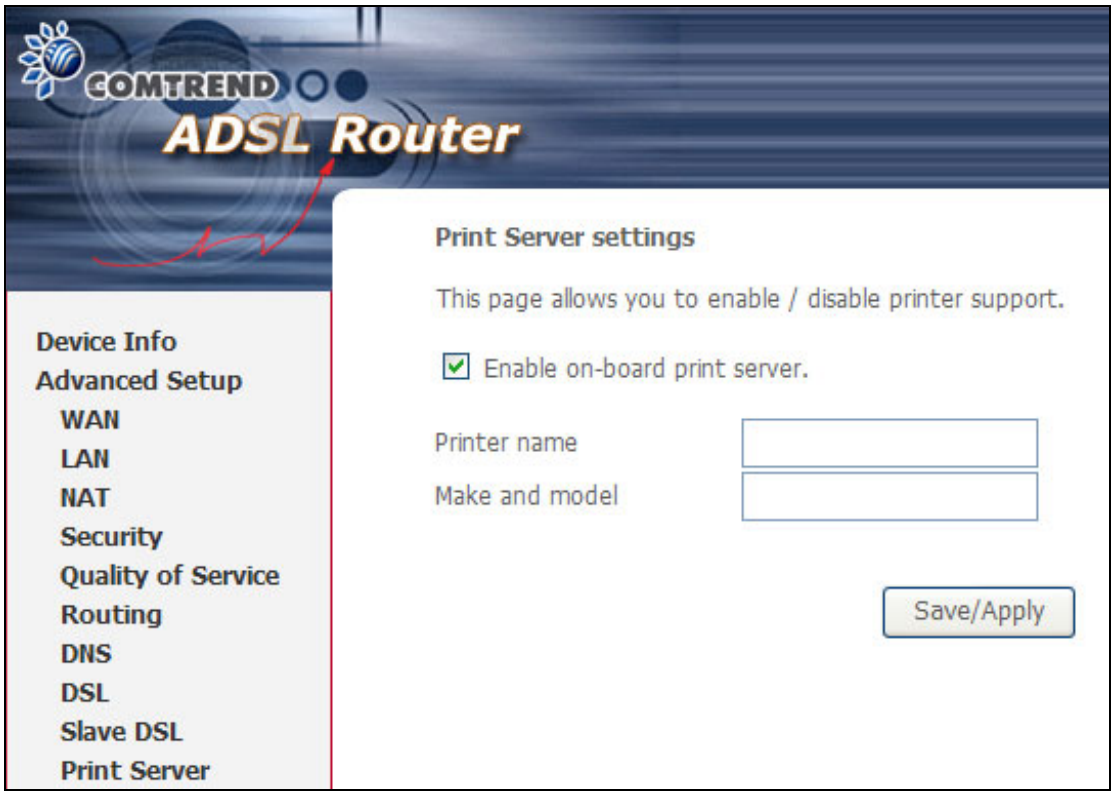
Step 7: If successful, the security settings will match those in Windows Vista.

Appendix F - Printer Server

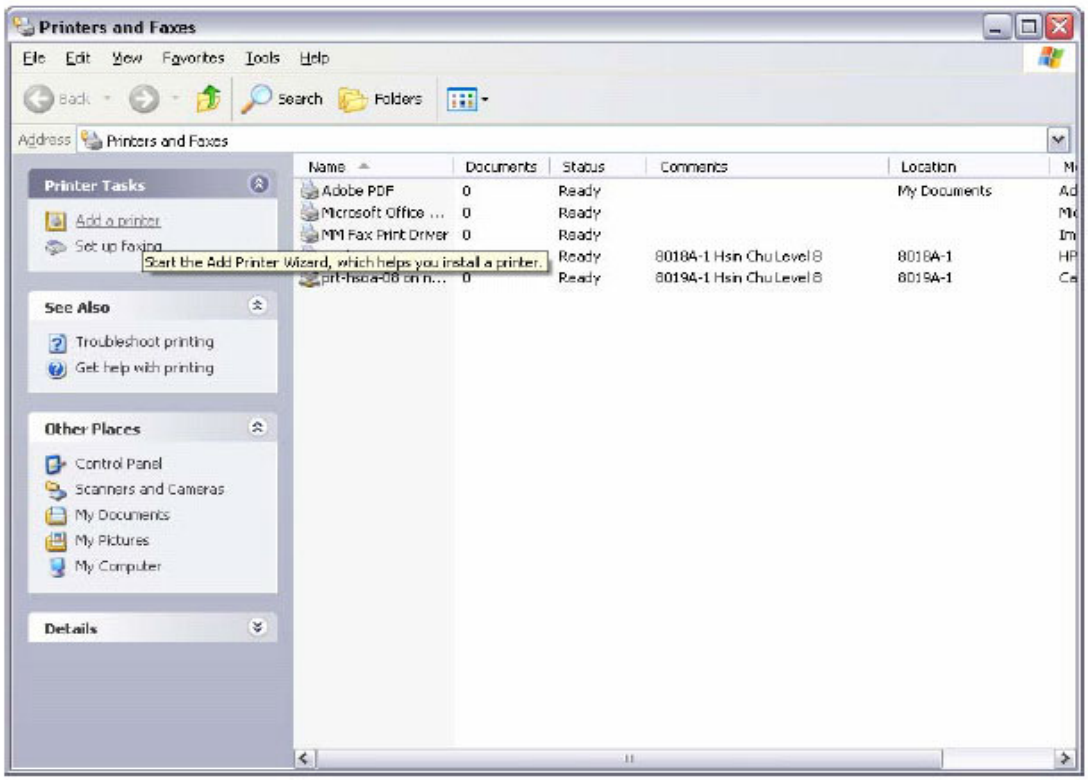
These steps explain the procedure for enabling the Printer Server.

STEP 1: Enable Print Server from Web User Interface. Select Enable on-board print server checkbox ☑ and enter Printer name and Make and model

NOTE:	The **Printer name** can be any text string up to 40 characters. The **Make and model** can be any text string up to 128 characters.



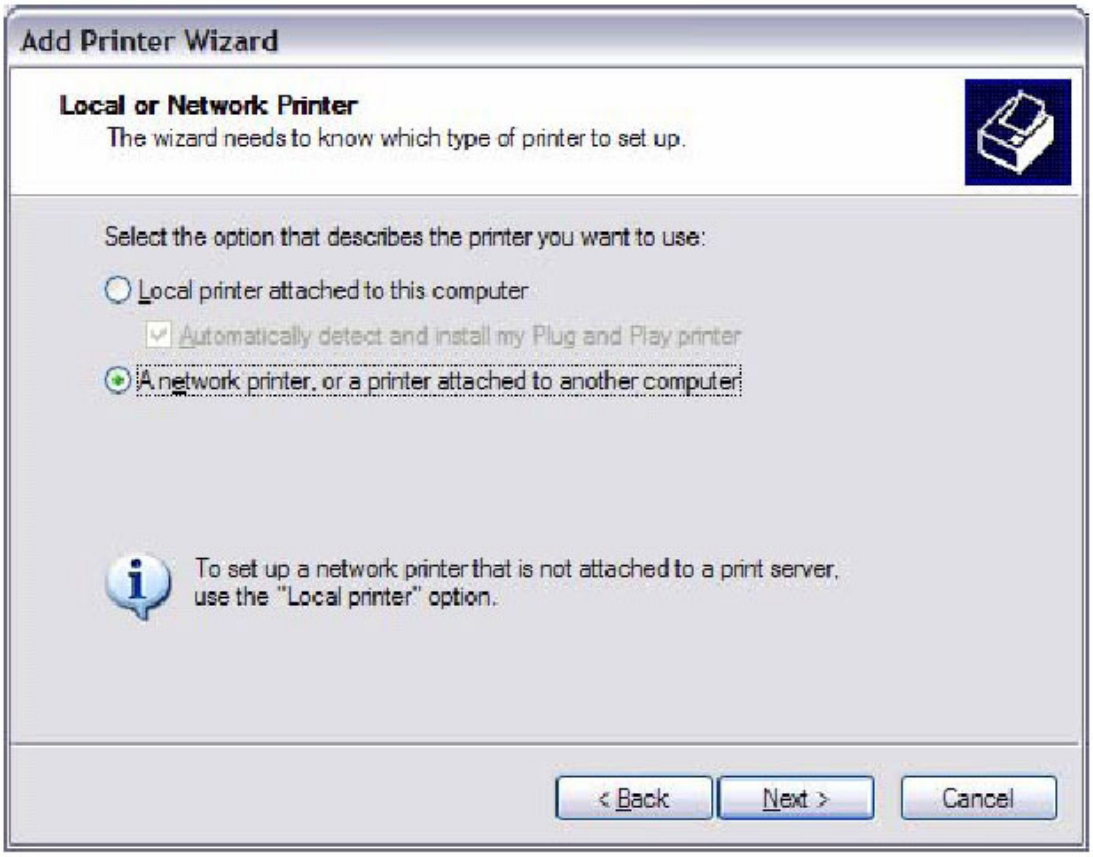
STEP 2: Go to the **Printers and Faxes** application in the **Control Panel** and select the **Add a printer** function (as located on the side menu below).



STEP 3: Click **Next** to continue when you see the dialog box below.

Add Printer Wizard
Welcome to the Add Printer Wizard
This wizard helps you install a printer or make printer connections.
If you have a Plug and Play printer that connects through a USB port (or any other hot pluggable port, such as IEEE 1394, infrared, and so on), you do not need to use this wizard. Click Cancel to close the wizard, and then plug the printer's cable into your computer or point the printer toward your computer's infrared port, and turn the printer on. Windows will automatically install the printer for you.
To continue, click Next.
< Back
Next >
Cancel

STEP 4: Select **Network Printer** and click **Next**.

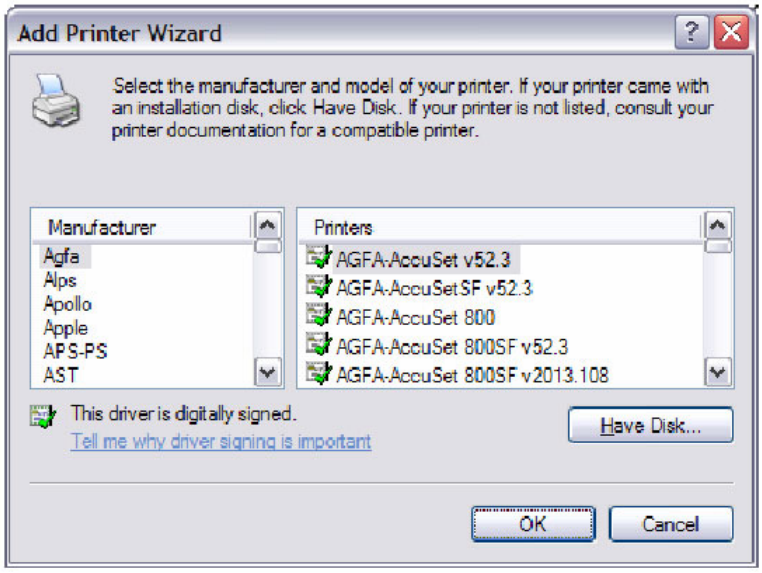

Add Printer Wizard
Local or Network Printer
The wizard needs to know which type of printer to set up.
Select the option that describes the printer you want to use:
Local printer attached to this computer
Automatically detect and install my Plug and Play printer
A network printer, or a printer attached to another computer
To set up a network printer that is not attached to a print server, use the "Local printer" option.
< Back
Next >
Cancel

STEP 5: Select Connect to a printer on the Internet and enter your printer link. (e.g. http://192.168.1.1:631/printers/hp3845) and click **Next**.

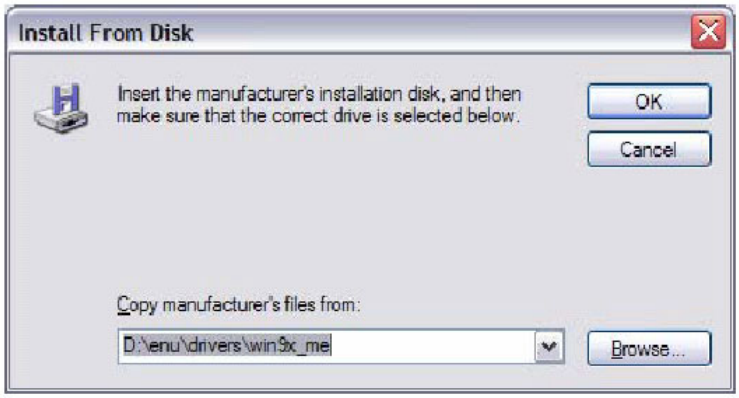
NOTE:	The printer name must be the same name entered in the ADSL modem WEB UI "printer server setting" as in step 1.

Add Printer Wizard
Specify a Printer
If you don't know the name or address of the printer, you can search for a printer that meets your needs.
What printer do you want to connect to?
Find a printer in the directory
Connect to this printer (or to browse for a printer, select this option and click Next):
Name:
Example: \\server\printer
Connect to a printer on the Internet or on a home or office network:
URL:
http://192.168.1.1:631/printers/hp3845
Example: http://server/printers/myprinter/.printer
< Back
Next >
Cancel

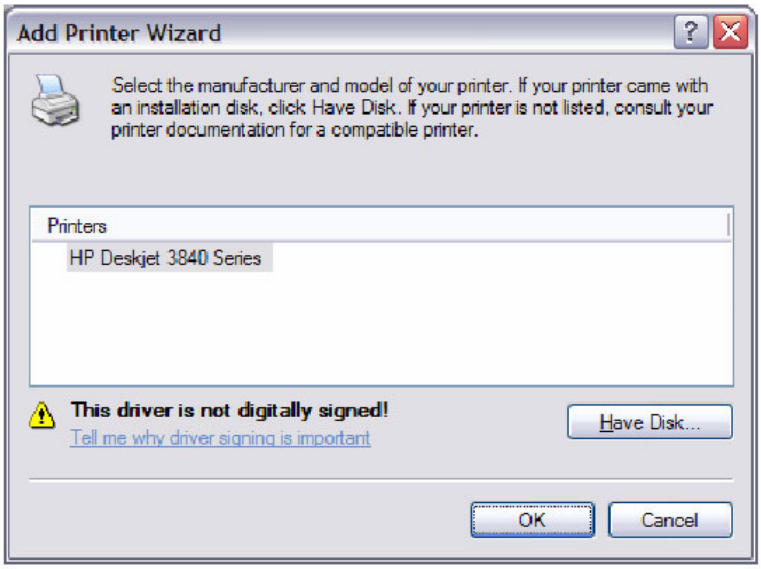
STEP 6: Click **Have Disk** and insert the printer driver CD.



STEP 7: Select driver file directory on CD-ROM and click **OK**.



STEP 8: Once the printer name appears, click **OK**.

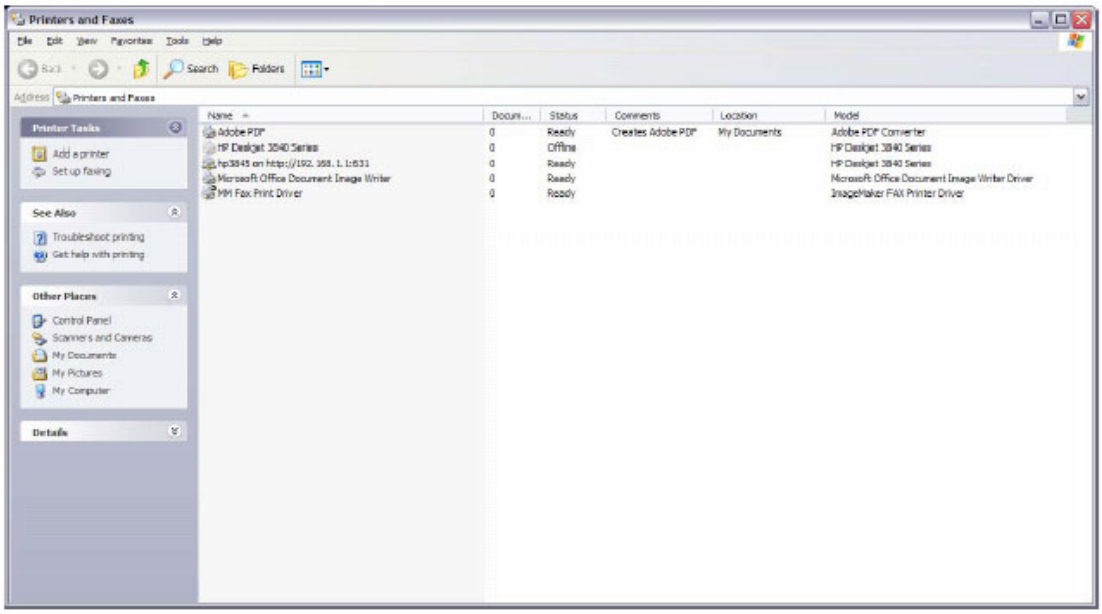

Add Printer Wizard
Select the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for a compatible printer.
Printers
HP Deskjet 3840 Series
This driver is not digitally signed!
Tell me why driver signing is important
Have Disk...
OK
Cancel

STEP 9: Choose **Yes** or **No** for default printer setting and click **Next.**

Add Printer Wizard
Default Printer
Your computer will always send documents to the default printer unless you specify otherwise.
Do you want to use this printer as the default printer?
Yes
No
< Back
Next >
Cancel

STEP 10: Click Finish.

STEP 11: Check the status of printer from Windows Control Panel, printer window. Status should show as **Ready**.



Appendix G - 3G USB Dongle

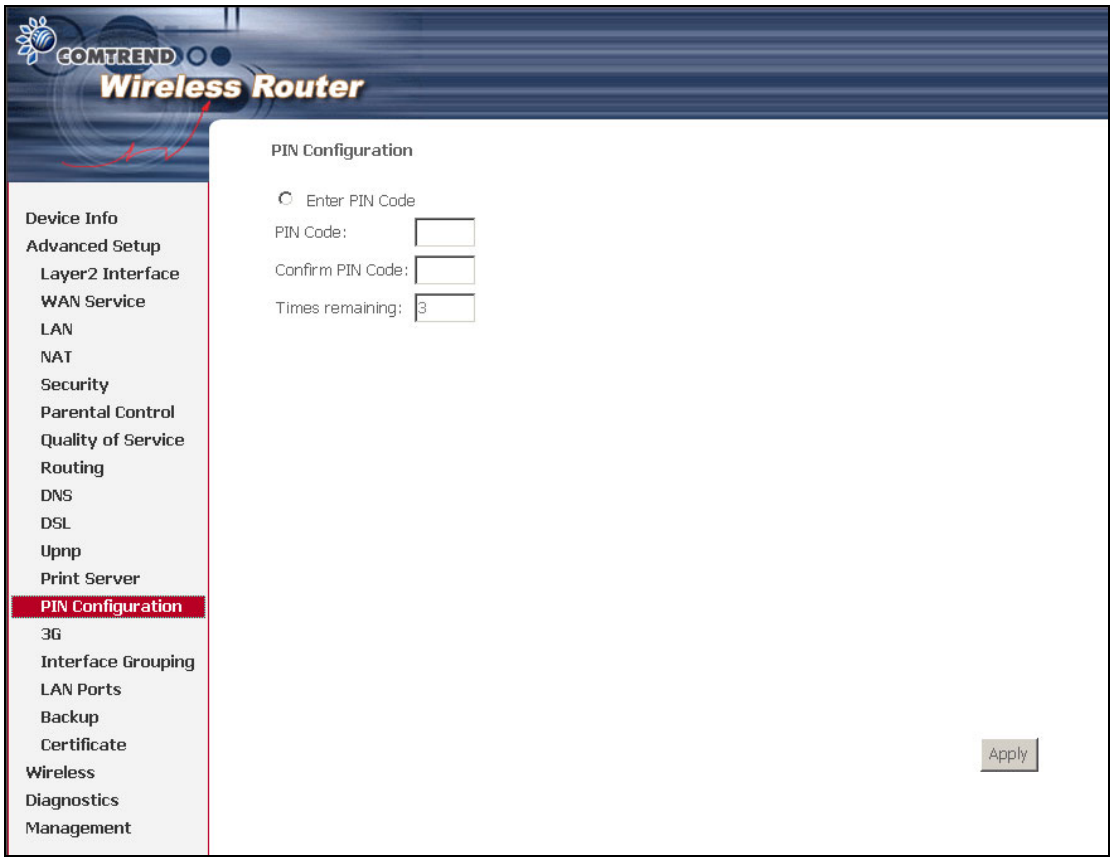
Follow these steps to configure your Bandluxe C270 or O2 Huawei E160 USB dongle.

NOTE:	These screens become available when the USB dongle is plugged in.

STEP 1: Plug the USB Dongle into the USB Host port.

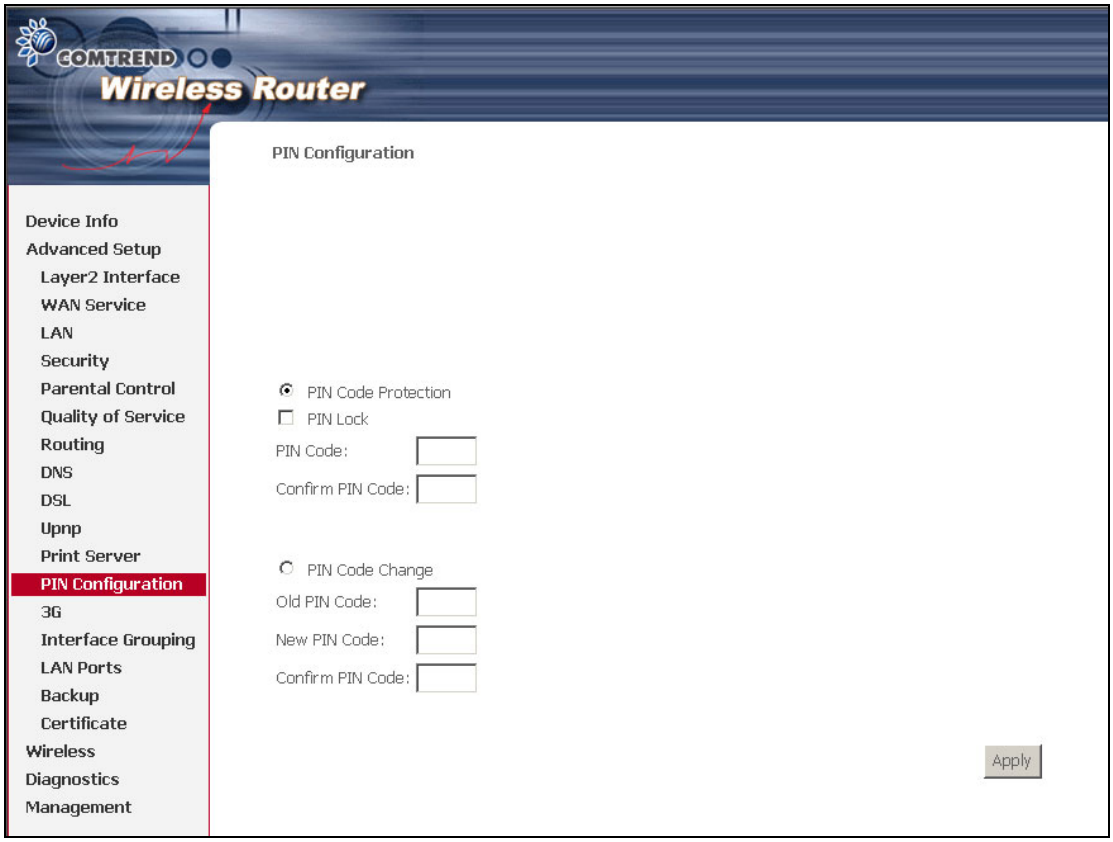
STEP 2: Turn on the CT-5364A and login to the Web User Interface.

STEP 3: If your 3G USB Dongle has a protected SIM card, go to **Advanced Setup** → **PIN Configuration** and enter the PIN code to unlock the SIM card.

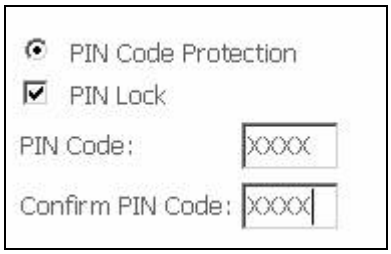
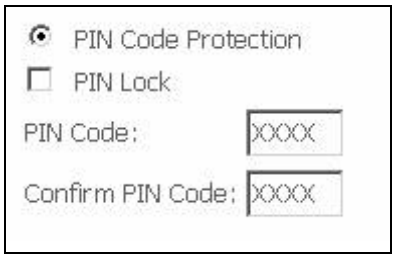


After unlocking the SIM card, PIN Code Protection can be enabled or disabled. Please reference the figure and table below for further instructions.

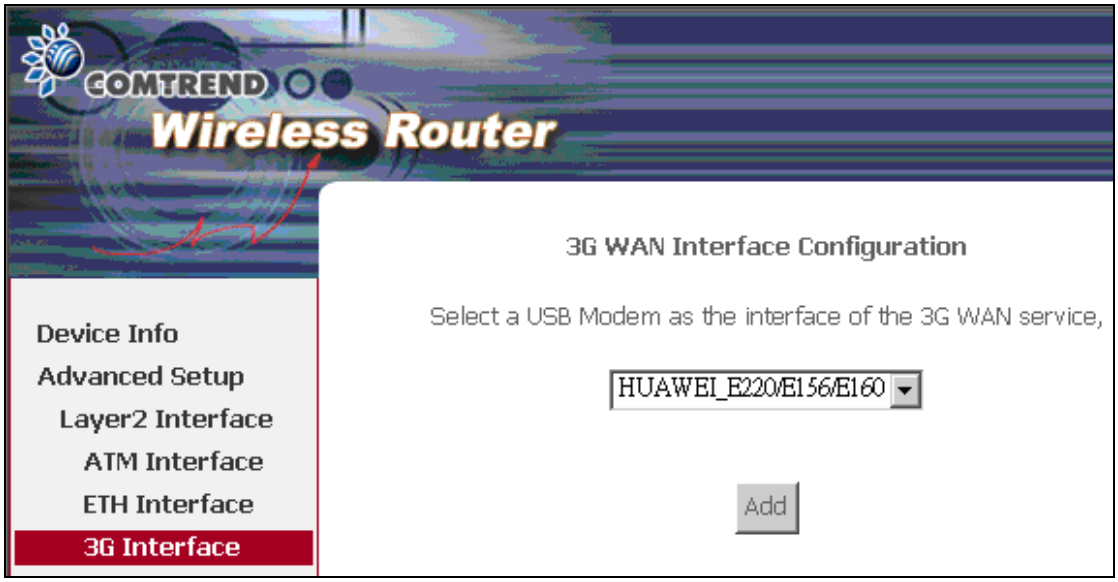
NOTE:	The PIN code cannot be changed when PIN Code Protection is enabled.



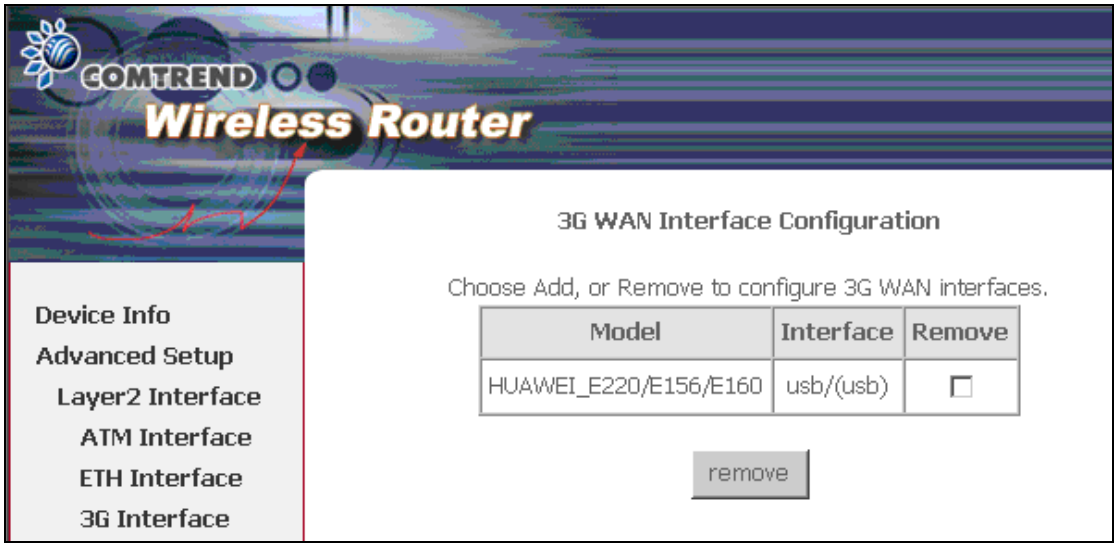
This table summarizes the PIN Code Protection procedures.

Enable PIN Code Protection	Disable PIN Code Protection
Select PIN Code Protection → tick PIN Lock checkbox ☑ → enter PIN code and click **Apply**.	Select PIN Code Protection → untick PIN Lock checkbox ☑ → enter PIN code and click **Apply**.
	

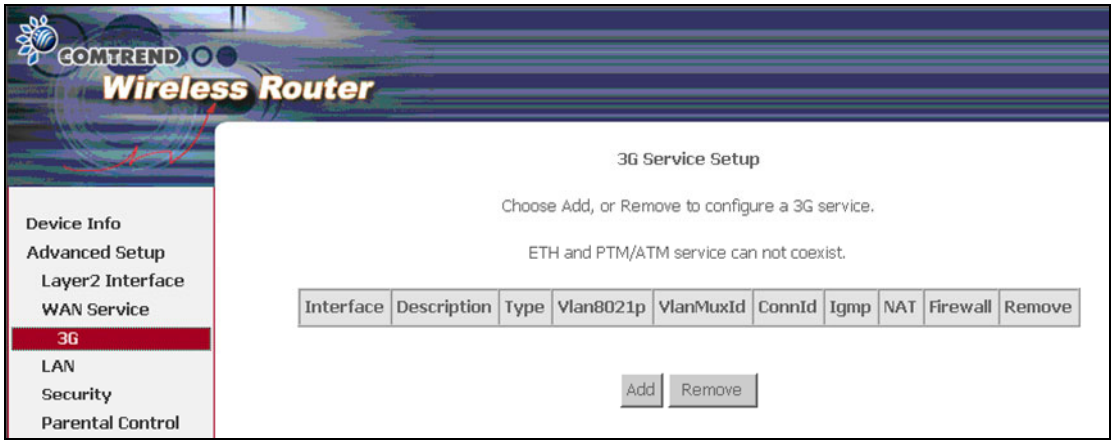
STEP 4: Go to the **3G Interface** screen. Click **Add** to create a 3G Interface.

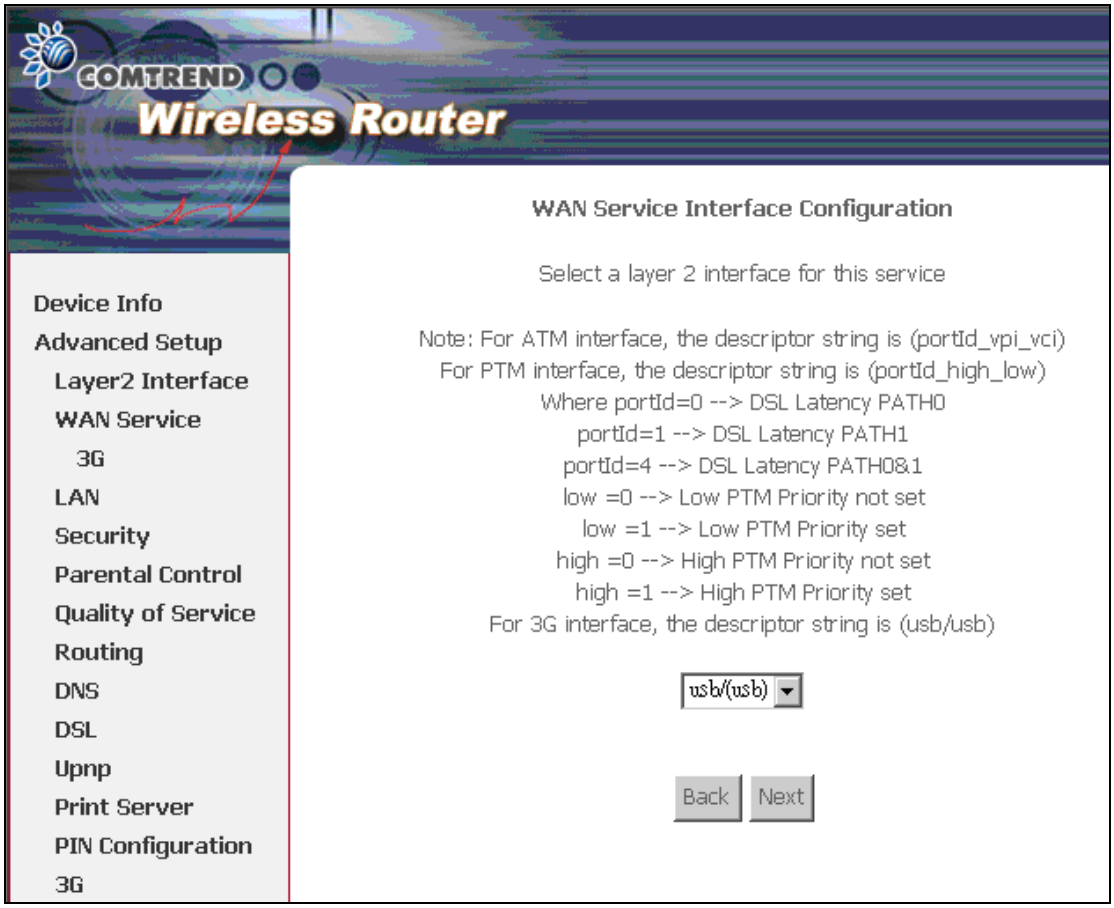

COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
ATM Interface
ETH Interface
3G Interface
3G WAN Interface Configuration
Select a USB Modem as the interface of the 3G WAN service,
HUAWEI_E220/E156/E160
Add

The **3G Interface** screen will display as shown below.



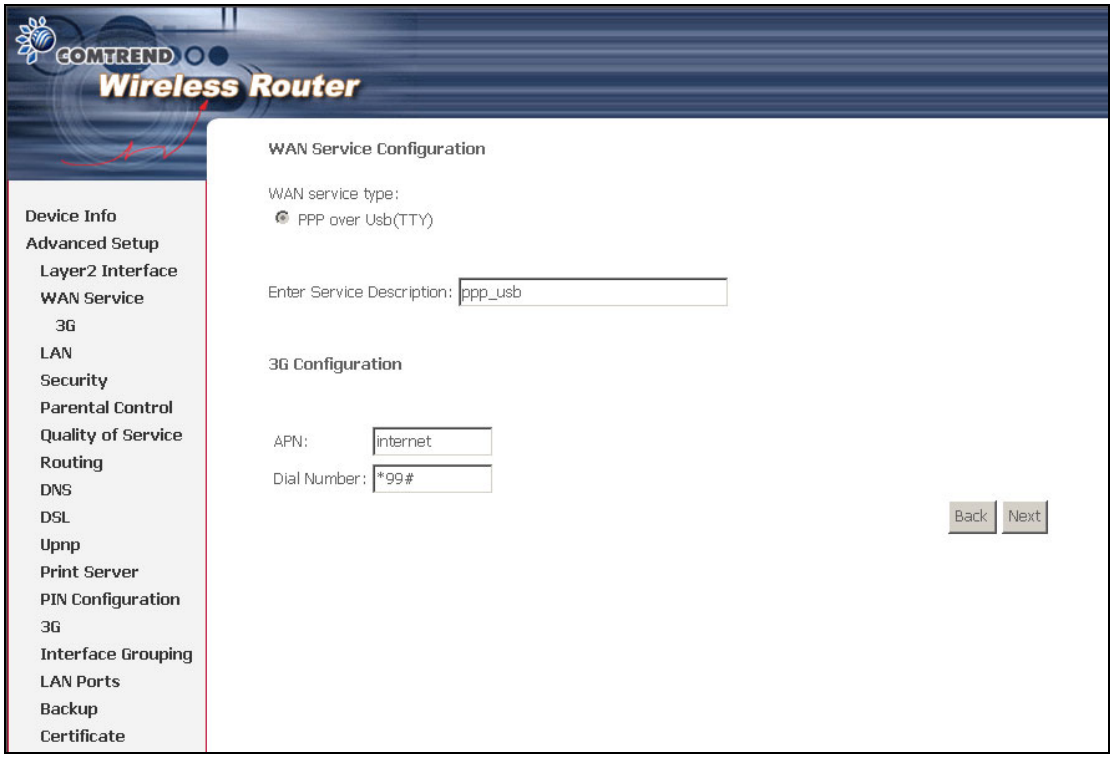
STEP 5: Go to the **3G Service Setup** screen. Click **Add** to create a 3G service.



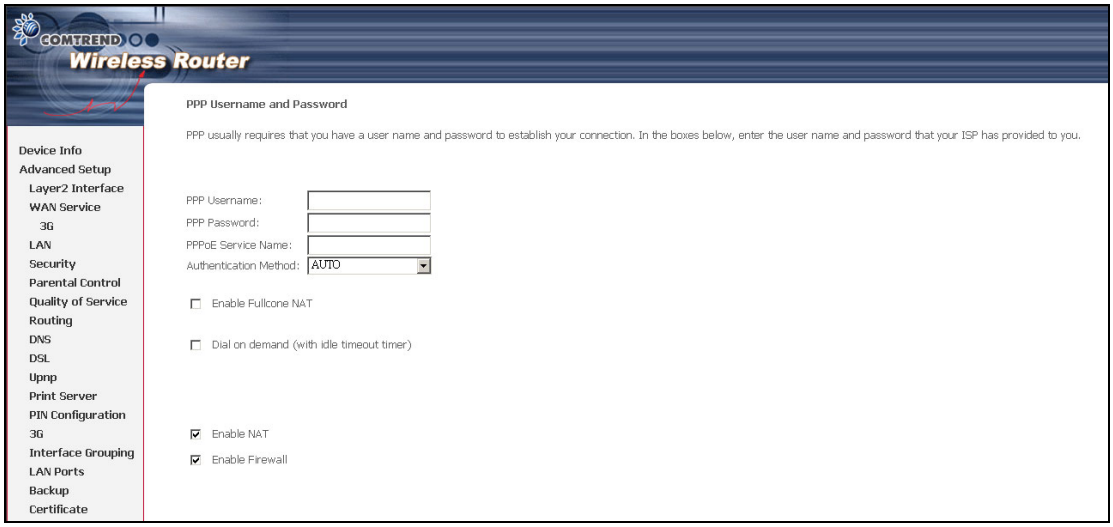


STEP 6: The screen will display as shown above. Click **Next** to continue.

STEP 7: Enter values for APN and Dial Number. Click **Next** to continue.

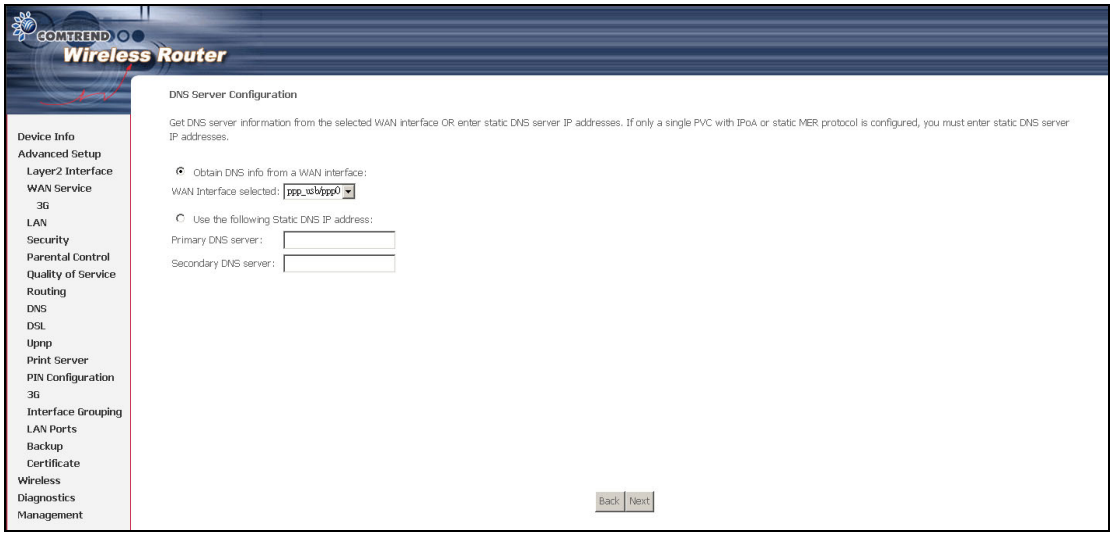


STEP 8: Select options and enter PPP username and password, if needed.

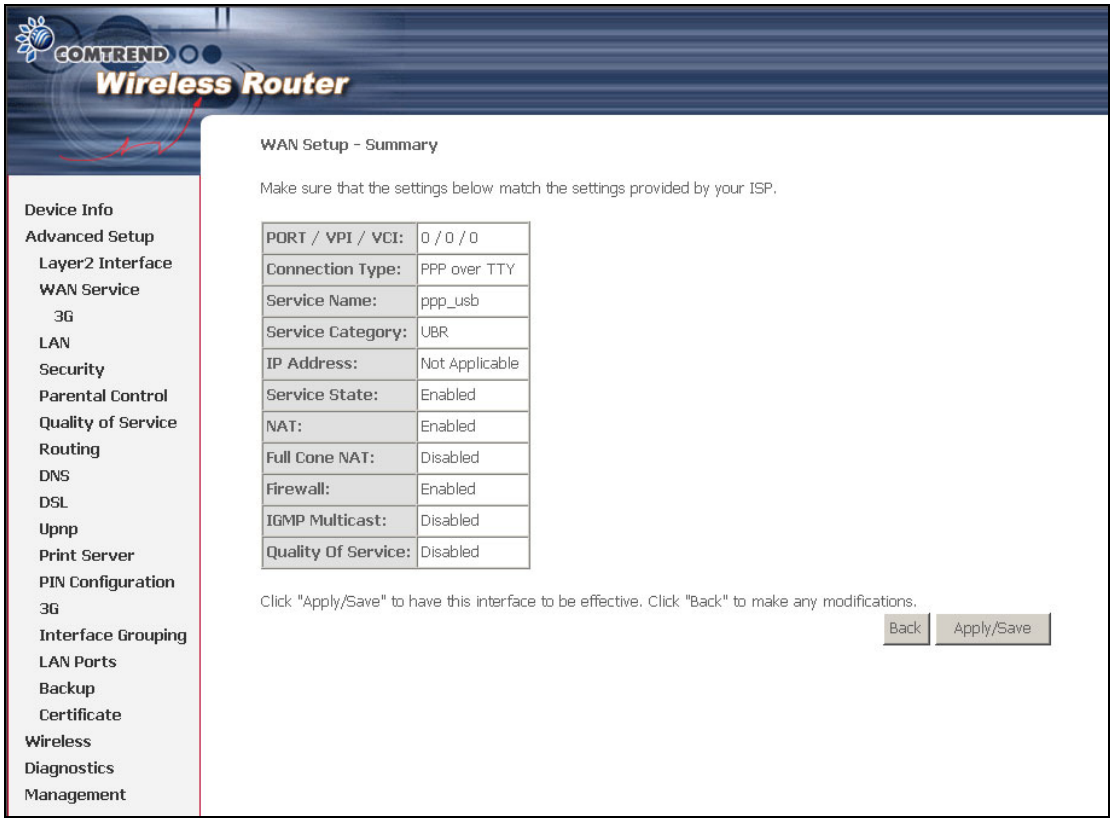


STEP 9: Click **Next** to continue.

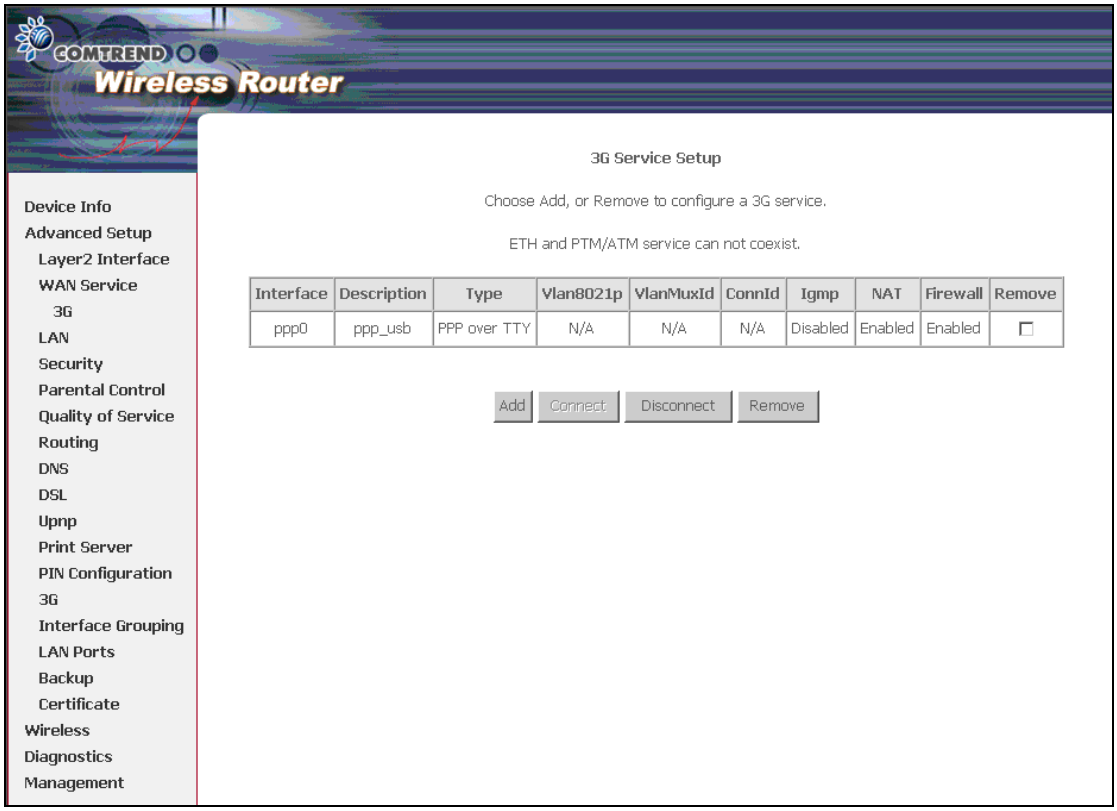
STEP 10: Click **Next** to continue.



STEP 11: Click **Next** to continue. The WAN Setup screen will display as follows.

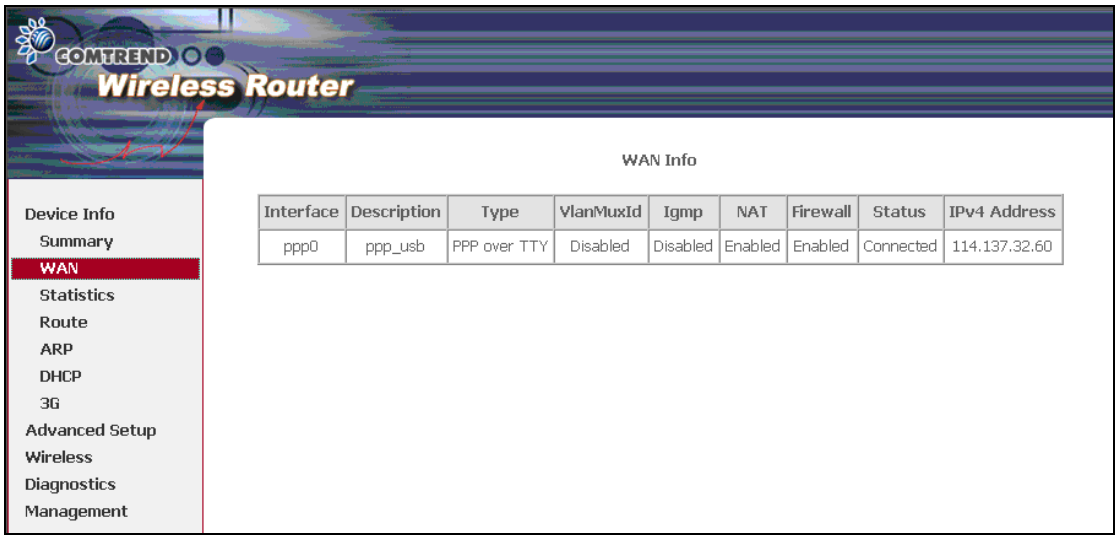


STEP 12: Click **Apply/Save** to create the 3G service.

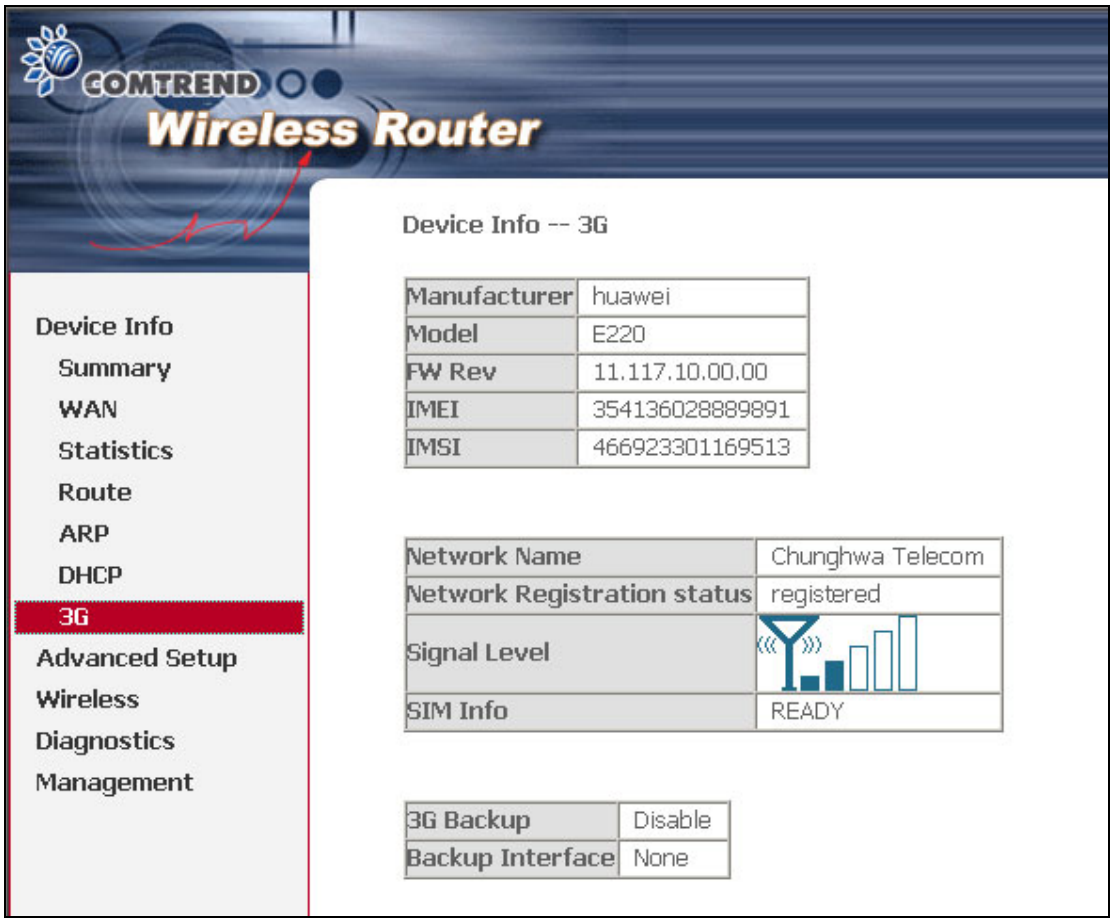


STEP 13: The new 3G service should appear on the next screen as shown above. To create another 3G service click **Add**. To delete a 3G service select the corresponding checkbox ☑ in the Remove column and click **Remove**. To connect or disconnect the 3G service click **Connect** or **Disconnect**.

STEP 14: Go to **Device Info → WAN** and check the 3G service status.



STEP 15: Go to **Device Info → 3G** for more detailed information.



See the table below for descriptions of each 3G service parameter.

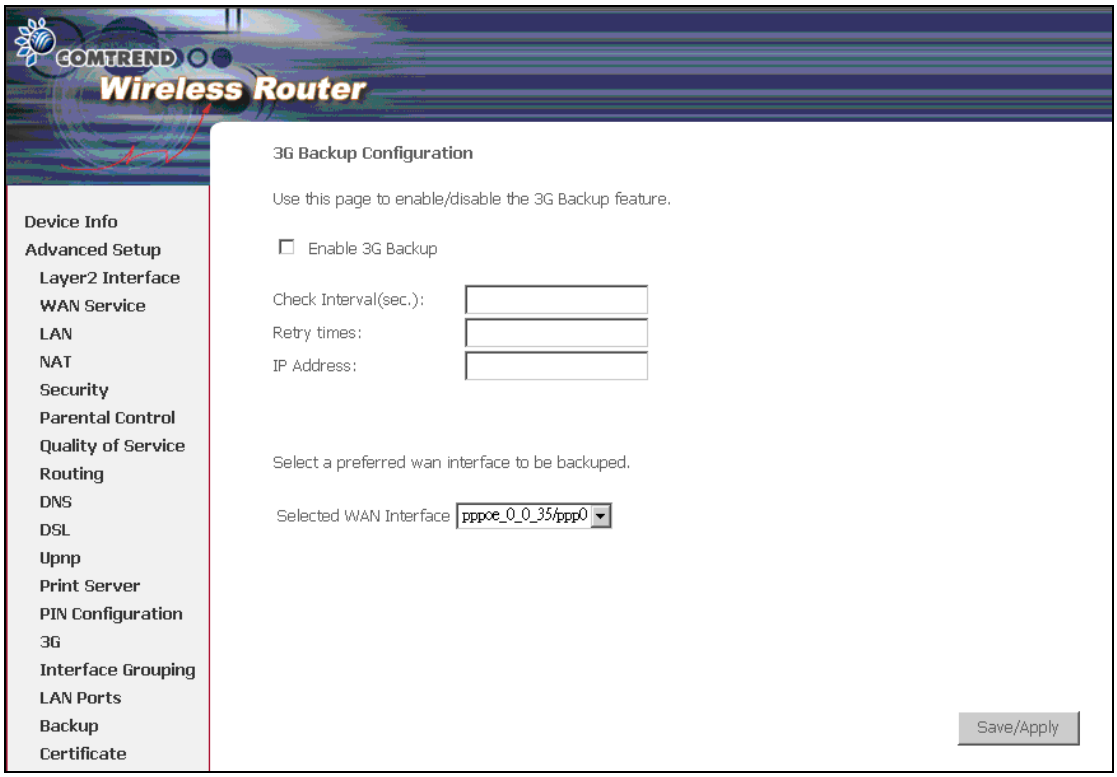
Parameter	Description
Manufacturer	3G USB dongle supplier.
Model	3G USB dongle model.
FW Rev	3G USB dongle firmware version.
IMEI	International Mobile Station Equipment Identity (IMEI) works like a serial number for GSM network devices.
IMSI	International Mobile Subscriber Identity (IMSI) is an user identification code stored on the 3G SIM card.
Network Name	The 3G service carrier.
Network Registration status	1) Registered 2) Not registered 3) Registration denied 4) Unknown 5) Registered, roaming 6) Failed
Signal Level	A bar chart showing the 3G signal strength.

Parameter	Description
SIM Info	1) READY 2) SIM PIN: waiting for PIN code 3) SIM PUK: waiting for PUK code 4) SIM not inserted
3G Backup	Enabled or Disabled; see STEP 16: 3G Backup Function.
Backup Interface	Displays 3G Backup WAN Interface or "None" if 3G Backup is Disabled.

STEP 16: 3G Backup Function

The 3G Backup function enables the 3G service to act as a backup to an ATM connection. If the ATM service loses its connection, the CT-5364A will enable and switch traffic to the 3G connection. To enable this function, there must be an ATM connection to monitor and it must be configured as the default gateway.

Assuming these conditions are met, go to the Advanced Setup → Backup screen.

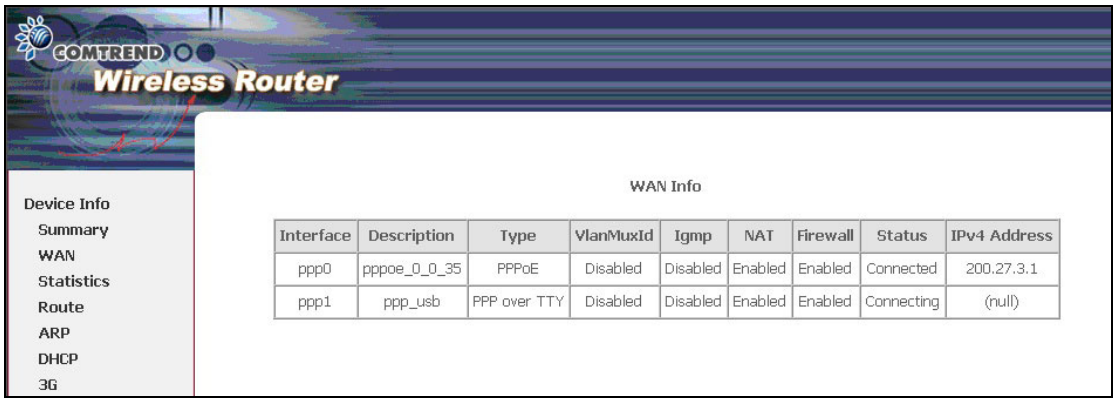


Select the Enable 3G Backup checkbox ☑ , enter related parameters, and click **Save/Apply**. Descriptions of these parameters are provided in the table below.

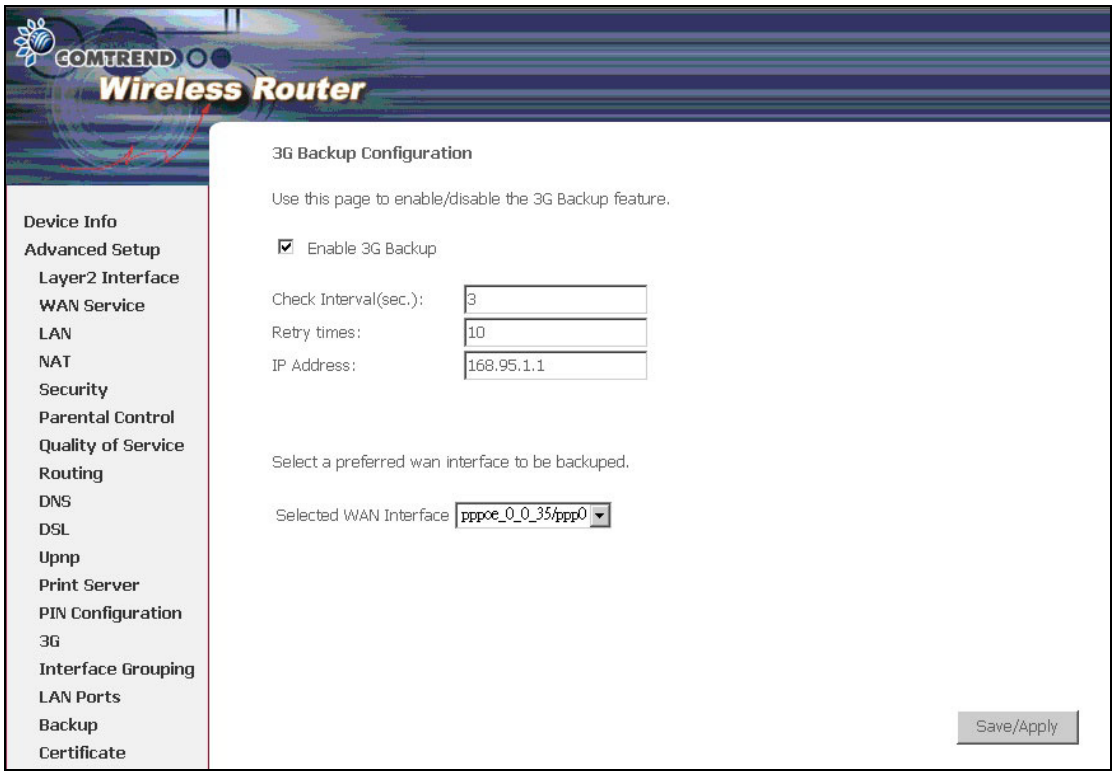
Parameter	Description
Check Interval (X)	PING test every X seconds
Retry time (Y)	PING Y times each test
IP address	IP address to PING
Selected WAN Interface	The wan interface to be monitored

EXAMPLE:

Assume we have configured the following connections …


COMTREND
Wireless Router
Device Info
Summary
WAN
Statistics
Route
ARP
DHCP
3G
WAN Info
Interface | Description | Type | VlanMuxId | Igmp | NAT | Firewall | Status | IPv4 Address
ppp0 | pppoe_0_0_35 | PPPoE | Disabled | Disabled | Enabled | Enabled | Connected | 200.27.3.1
ppp1 | ppp_usb | PPP over TTY | Disabled | Disabled | Enabled | Enabled | Connecting | (null)

… and the 3G backup screen is configured as shown below.



According to this configuration, the CT-5364A will PING 168.95.1.1 through the ppp0 (ATM interface) every 3 seconds. If the ppp0 connection (or the xDSL link) goes down, ppp0 data traffic will switch to ppp1 (3G interface). If ppp0 recovers, with 10 consecutive successful PING tests, the data traffic will return to ppp0 and the 3G connection will be cut off.

STEP 17: If you experience any difficulty, turn off the CT-5364A, remove the USB dongle, and repeat these steps from the beginning. You may also need to contact your 3G service carrier or device supplier for further assistance.

Appendix H - Connection Setup

Creating a WAN connection is a two-stage process.

1 - Setup the Layer 2 Interface (ATM or Ethernet)
2 - Add a WAN connection to the Layer 2 Interface.

The following sections describe each stage in turn.

H1 ~ Layer 2 Interfaces

The CT-5364A supports WAN connections over ATM or Ethernet interfaces, but these two interface types cannot be used in tandem, i.e. you must choose one.

Before proceeding to either the Ethernet instructions in section H1.2 or the ATM instructions in section H1.3, please read about connection modes in section H1.1.

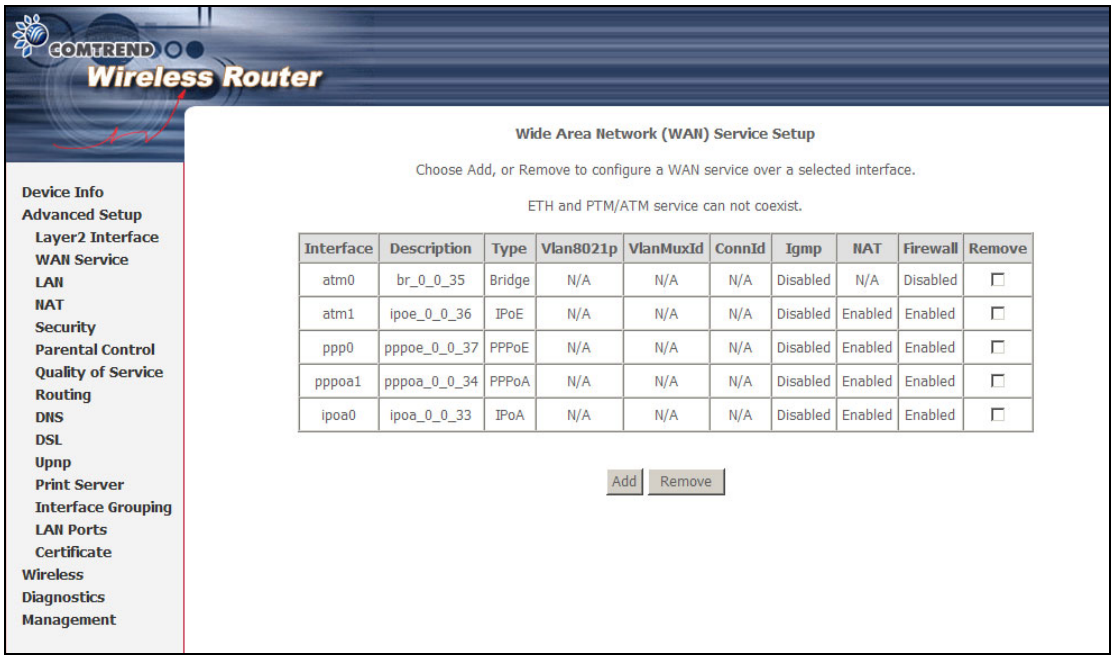
H1.1 Connection Modes

Every layer2 interface operates in one of three modes: Default, VLAN Mux or MSC. A short introduction to each of these three modes is included below for reference. It is important to understand the differences between these connection modes, as they determine the number and types of connections that may be configured.

DEFAULT MODE

In this mode there is a 1:1 relationship between interfaces and WAN connections, in that an interface in default mode supports just one connection. However, unlike the multiple connection modes described below, it supports all five connection types.

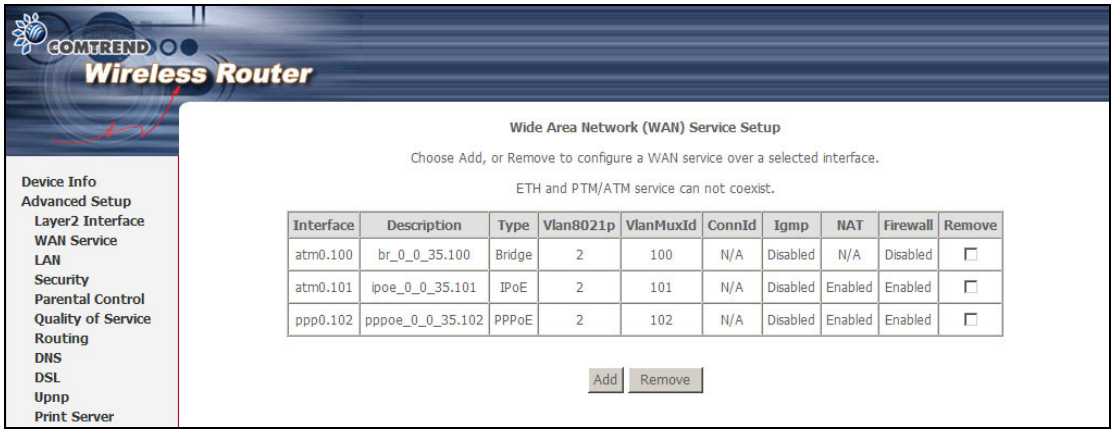
The figure below shows the full range of connection types available in default mode.



VLAN MUX MODE

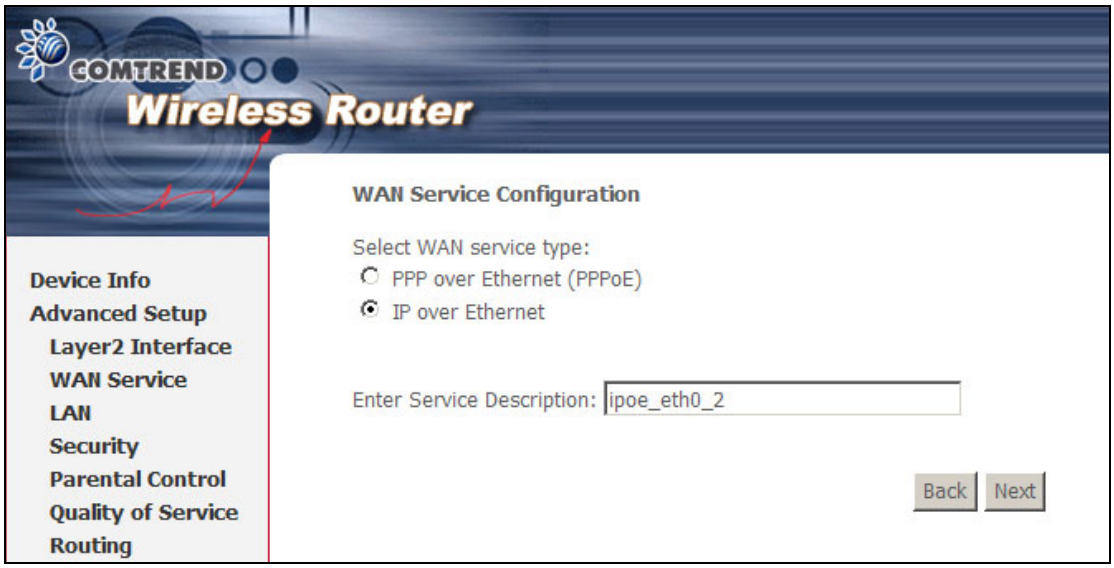
This mode uses VLAN tags to allow for multiple connections over a single interface. PPPoE, IPoE, and Bridge are supported while PPPoA and IPoA connections are not.

The figure below shows multiple connections over a single VLAN Mux interface.


COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
WAN Service
LAN
Security
Parental Control
Quality of Service
Routing
DNS
DSL
Upnp
Print Server
Wide Area Network (WAN) Service Setup
Choose Add, or Remove to configure a WAN service over a selected interface.
ETH and PTM/ATM service can not coexist.
Interface | Description | Type | Vlan8021p | VlanMuxId | ConnId | Igmp | NAT | Firewall | Remove
atm0.100 | br_0_0_35.100 | Bridge | 2 | 100 | N/A | Disabled | N/A | Disabled
atm0.101 | ipoe_0_0_35.101 | IPoE | 2 | 101 | N/A | Disabled | Enabled | Enabled
ppp0.102 | pppoe_0_0_35.102 | PPPoE | 2 | 102 | N/A | Disabled | Enabled | Enabled
Add
Remove

MSC MODE

Multi-Service Connection (MSC) mode supports multiple connections over a single interface. As with VLAN Mux mode, PPPoA and IPoA connection types are not supported, while Bridging is unavailable for Ethernet WAN interfaces. After adding WAN connections to an interface, you must also create an Interface Group to connect LAN/WAN interfaces.

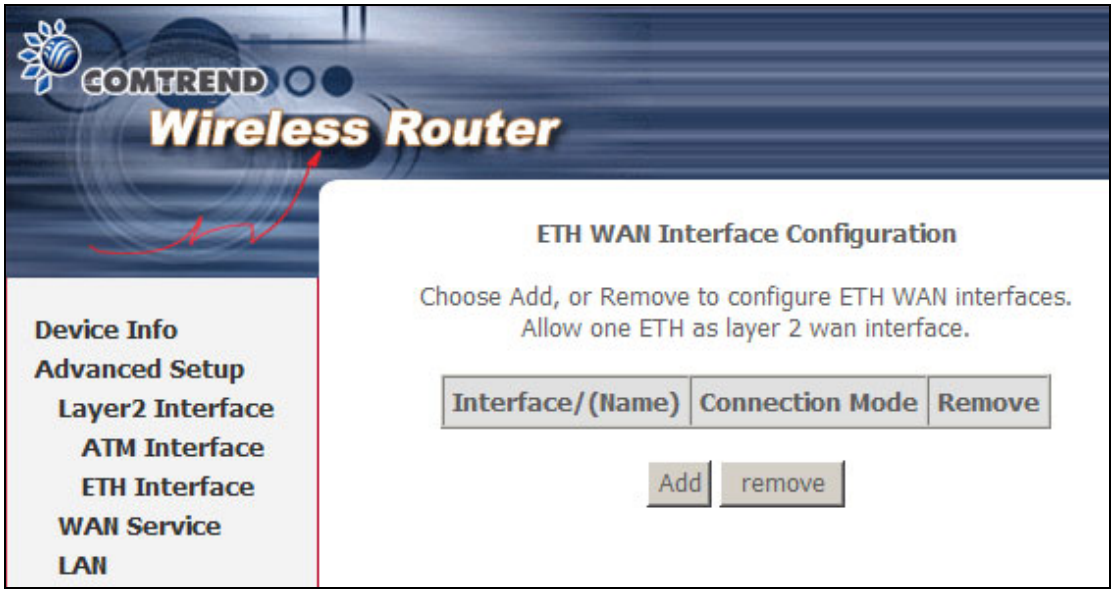


See section H3 ~ More About MSC Mode for detailed instructions.

H1.2 Ethernet WAN Interfaces

Follow these procedures to configure an Ethernet WAN interface. The CT-5364A supports a single Ethernet WAN interface over the ETH WAN port.

STEP 1: Go to the Advanced Setup → Layer2 Interface → ETH Interface screen.

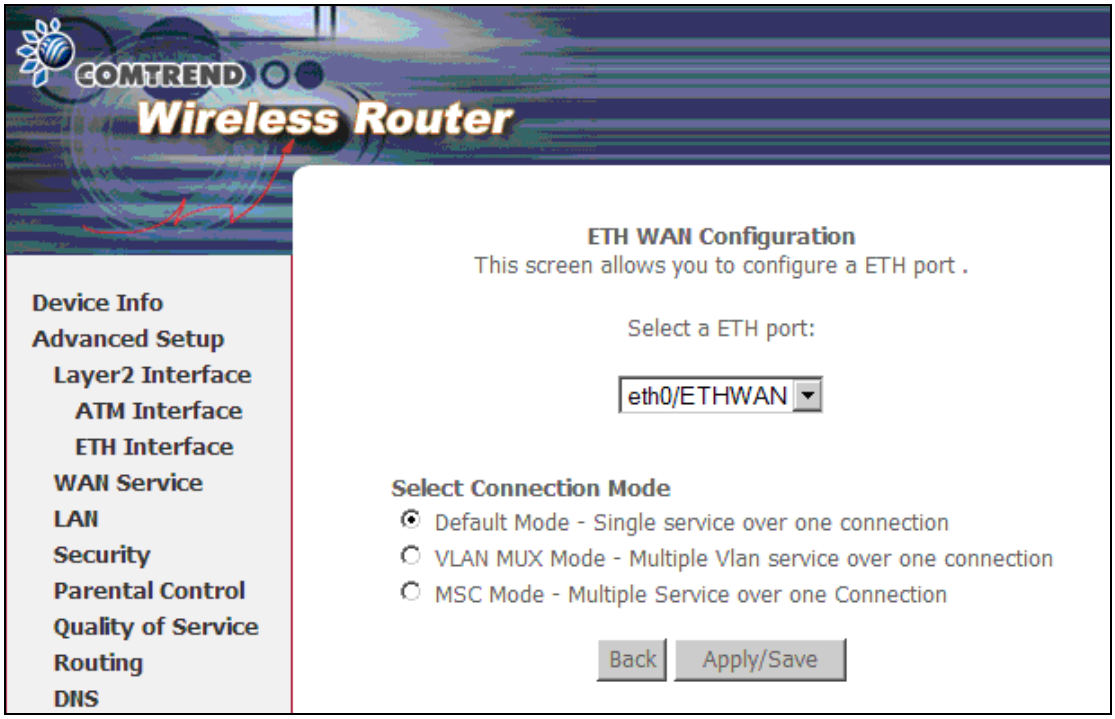


This table is provided here for ease of reference.

Heading	Description
Interface/ (Name)	ETH WAN Interface
Connection Mode	Default Mode – Single service over one connection Vlan Mux Mode – Multiple Vlan service over one connection MSC Mode – Multiple Service over one Connection
Remove	Select the checkbox and click **Remove** to remove the connection.

STEP 2: Click **Add** to proceed to the next screen.

NOTE:	To add WAN connections to one interface type, you must delete existing connections from the other interface type using the **remove** button.

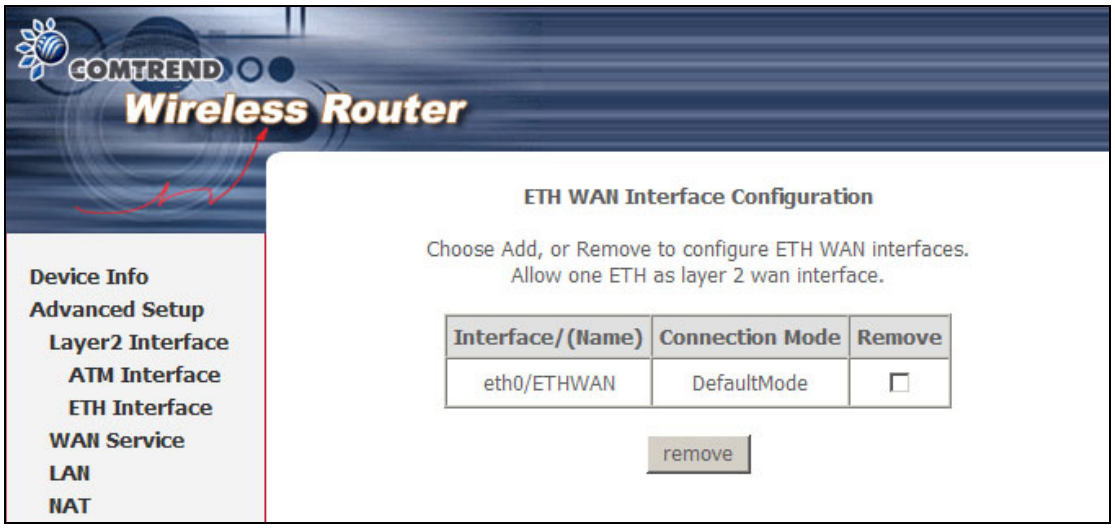


STEP 3: Select a Connection Mode from the options shown above.

NOTE:	This determines the number of WAN connections available.

STEP 4: Click **Apply/Save** to confirm your choice.

The figure below shows an Ethernet WAN interface configured in Default Mode.



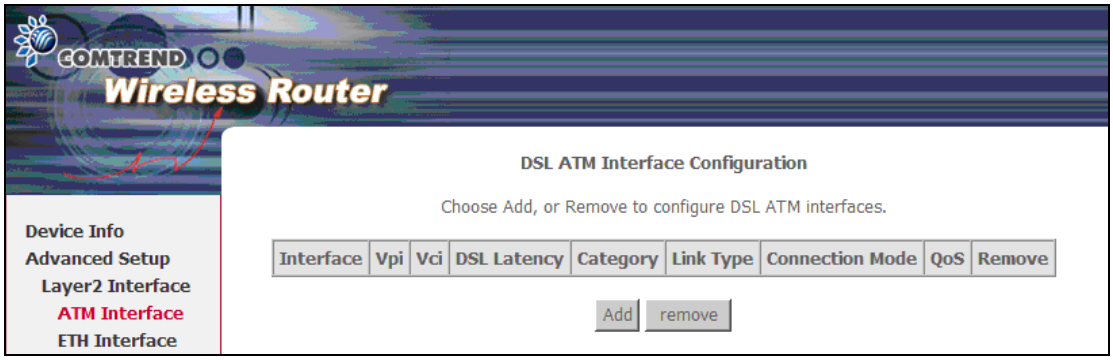
To add a WAN connection to the Ethernet WAN interface go to WAN Connection.

H1.3 ATM Interfaces

Follow these procedures to configure an ATM interface.

NOTE:	The CT-5364A supports up to 8 ATM interfaces.

STEP 1: Go to the Advanced Setup → Layer2 Interface → ATM Interface screen.

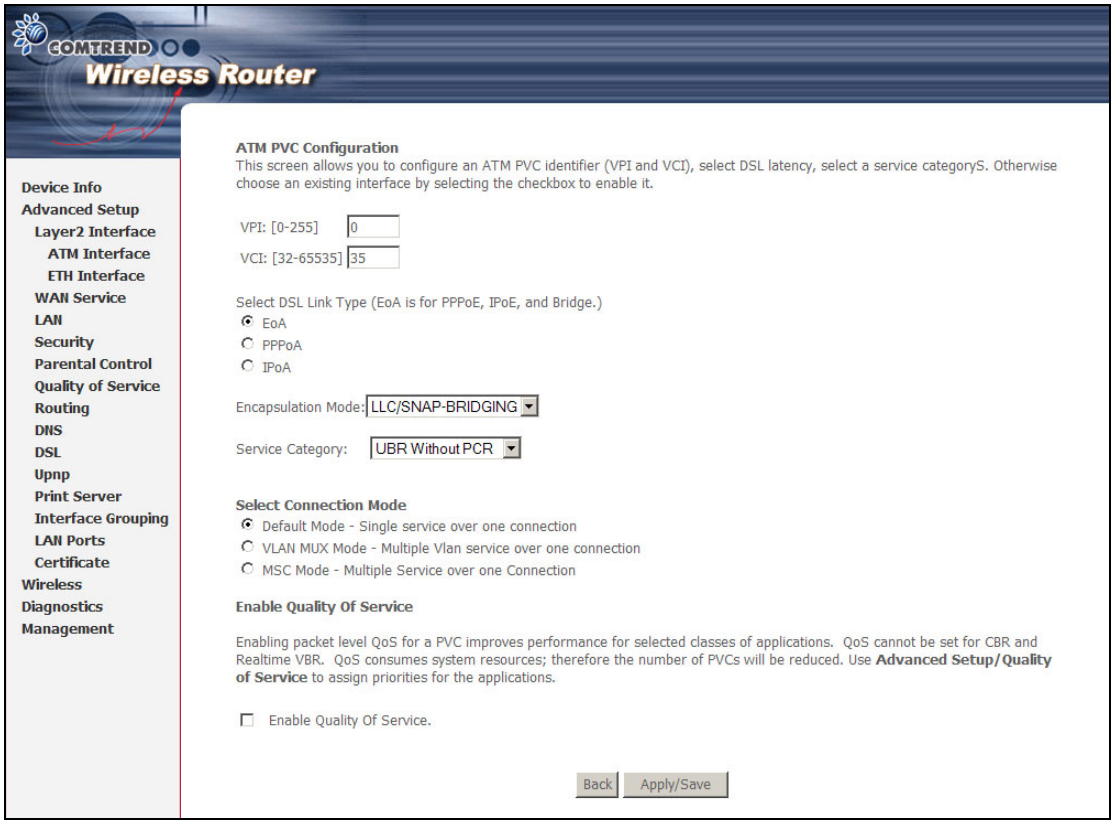


This table is provided here for ease of reference.

Heading	**Description**
Interface	WAN interface name.
VPI	ATM VPI (0-255)
VCI	ATM VCI (32-65535)
DSL Latency	{Path0} indicates that PVC portID = 0
Category	ATM service category
Link Type	Choose EoA (for PPPoE, IPoE, and Bridge), PPPoA, or IPoA.
Connection Mode	Default Mode – Single service over one connection Vlan Mux Mode – Multiple Vlan service over one connection MSC Mode – Multiple Service over one Connection
QoS	Quality of Service (QoS) status
Remove	Select items for removal

STEP 2: Click **Add** to proceed to the next screen.

NOTE:	To add WAN connections to one interface type, you must delete existing connections from the other interface type using the **remove** button.


COMTREND
Wireless Router
Device Info
Advanced Setup
Layer2 Interface
ATM Interface
ETH Interface
WAN Service
LAN
Security
Parental Control
Quality of Service
Routing
DNS
DSL
Upnp
Print Server
Interface Grouping
LAN Ports
Certificate
Wireless
Diagnostics
Management
ATM PVC Configuration
This screen allows you to configure an ATM PVC identifier (VPI and VCI), select DSL latency, select a service categoryS. Otherwise choose an existing interface by selecting the checkbox to enable it.
VPI: [0-255] 0
VCI: [32-65535] 35
Select DSL Link Type (EoA is for PPPoE, IPoE, and Bridge.)
EoA
PPPoA
IPoA
Encapsulation Mode: LLC/SNAP-BRIDGING
Service Category: UBR Without PCR
Select Connection Mode
Default Mode - Single service over one connection
VLAN MUX Mode - Multiple Vlan service over one connection
MSC Mode - Multiple Service over one Connection
Enable Quality Of Service
Enabling packet level QoS for a PVC improves performance for selected classes of applications. QoS cannot be set for CBR and Realtime VBR. QoS consumes system resources; therefore the number of PVCs will be reduced. Use Advanced Setup/Quality of Service to assign priorities for the applications.
Enable Quality Of Service.
Back
Apply/Save

There are many settings that must be configured here: VPI/VCI, DSL Link Type, Encapsulation Mode, Service Category, Connection Mode and Quality of Service.

NOTE: Connection Mode determines the number of WAN connections available.

The table below shows DSL Link Type availability for each Connection Mode.

	DSL Link Type		
Connection Mode	EoA*	PPPoA	IPoA
Default Mode	OK	OK	OK
VLAN Mux Mode	OK	X	X
MSC Mode	OK	X	X

* EoA includes PPPoE, IPoE, and Bridge link types.

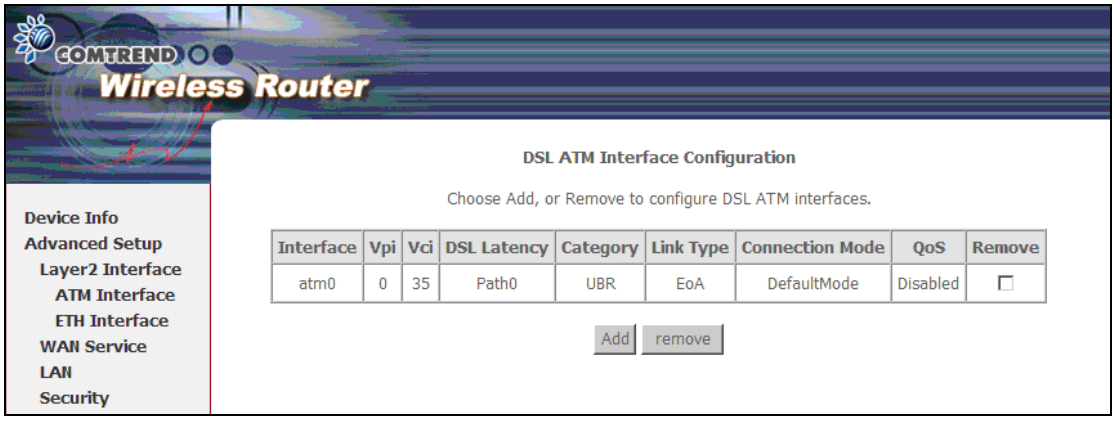
Here are the available encapsulations for each DSL link type:

- PPPoA- VC/MUX, LLC/ENCAPSULATION
- PPPoE- LLC/SNAP BRIDGING, VC/MUX
- MER- LLC/SNAP-BRIDGING, VC/MUX
- IPoA- LLC/SNAP-ROUTING, VC MUX
- Bridging- LLC/SNAP-BRIDGING, VC/MUX

STEP 3: Click **Apply/Save** to confirm your choices.

On the next screen, check that the ATM interface is added to the list.

For example, an ATM interface on PVC 0/35 (VPI/VCI) in Default Connection Mode with an EoA Link type is shown below.



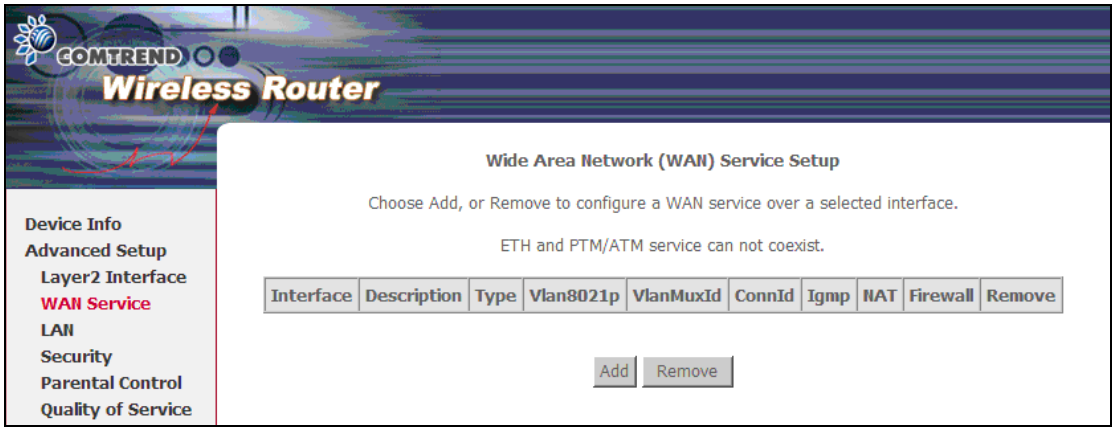
To add a WAN connection to an ATM WAN interface go to the next section.

H2 ~ WAN Connections

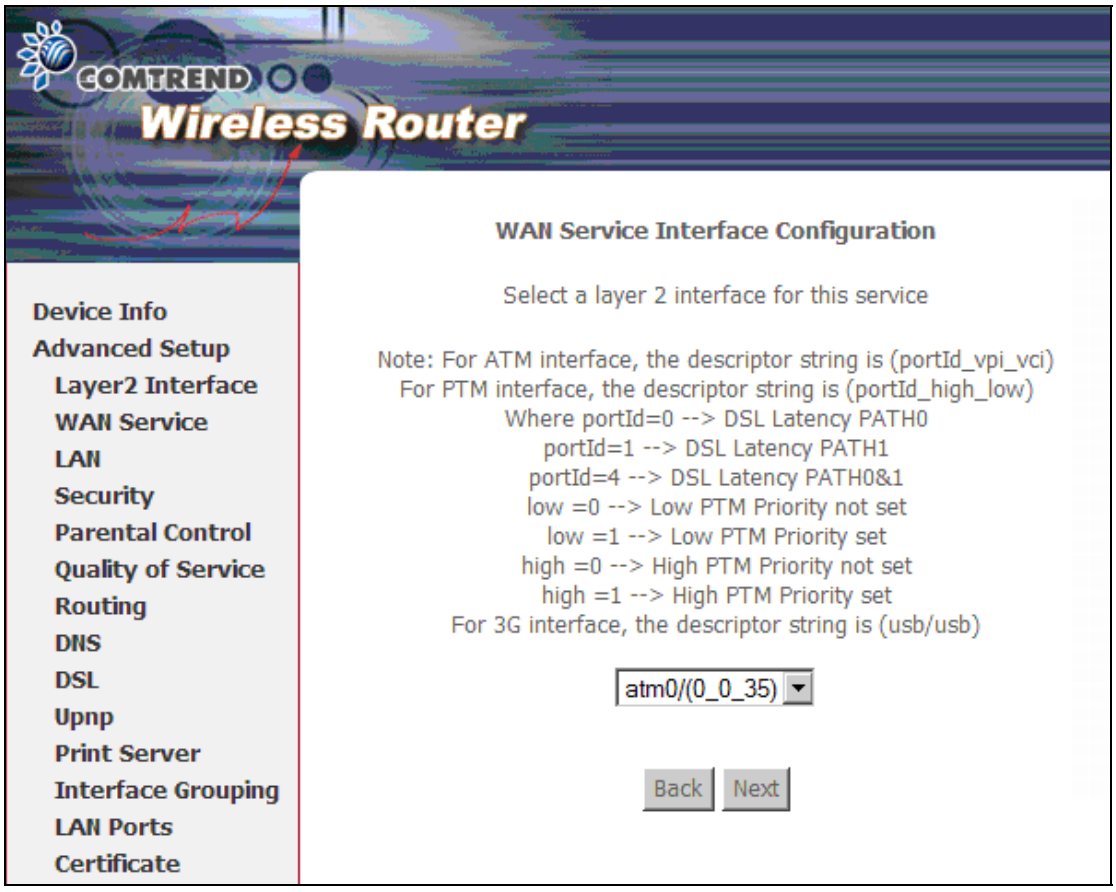
In Default Mode, the CT-5364A supports one WAN connection for each interface, up to a maximum of 8 connections. VLAN Mux and MSC support up to 16 connections.

To setup a WAN connection follow these instructions.

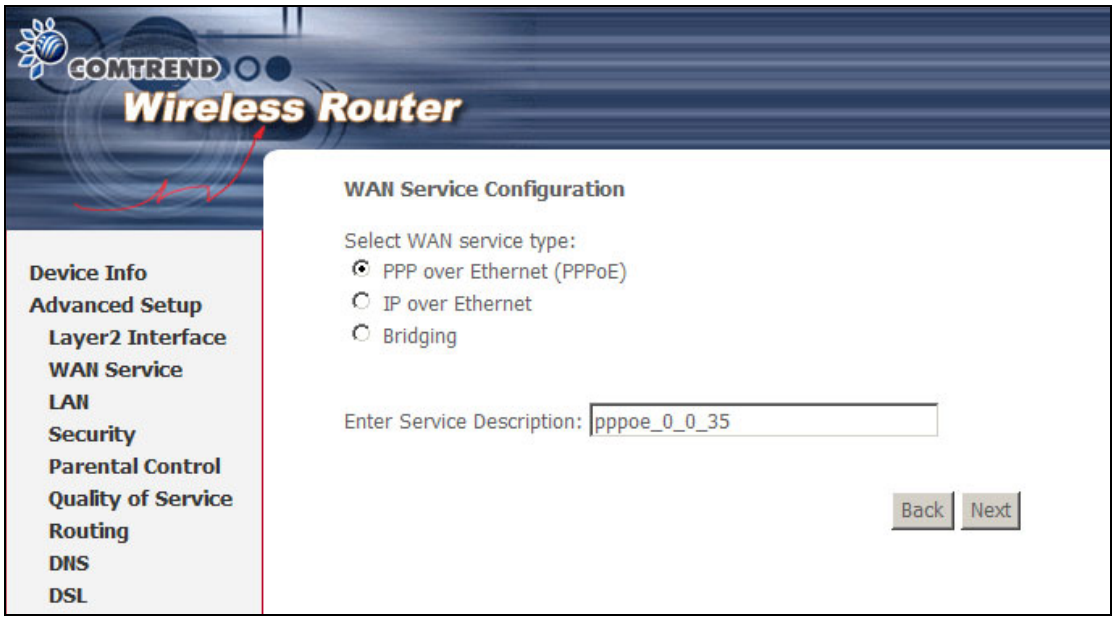
STEP 1: Go to the Advanced Setup → WAN Service screen.



STEP 2: Click **Add** to create a WAN connection. The following screen will display.

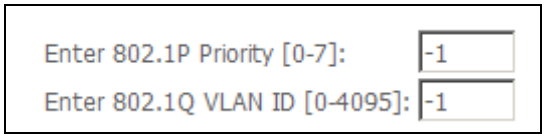


STEP 3: Choose a layer 2 interface from the drop-down box and click **Next**. The WAN Service Configuration screen will display as shown below.



NOTE: The WAN services shown here are those supported by the layer 2 interface you selected in the previous step. If you wish to change your selection click the **Back** button and select a different layer 2 interface.

STEP 4: For VLAN Mux Connections only, you must enter Priority & VLAN ID tags.



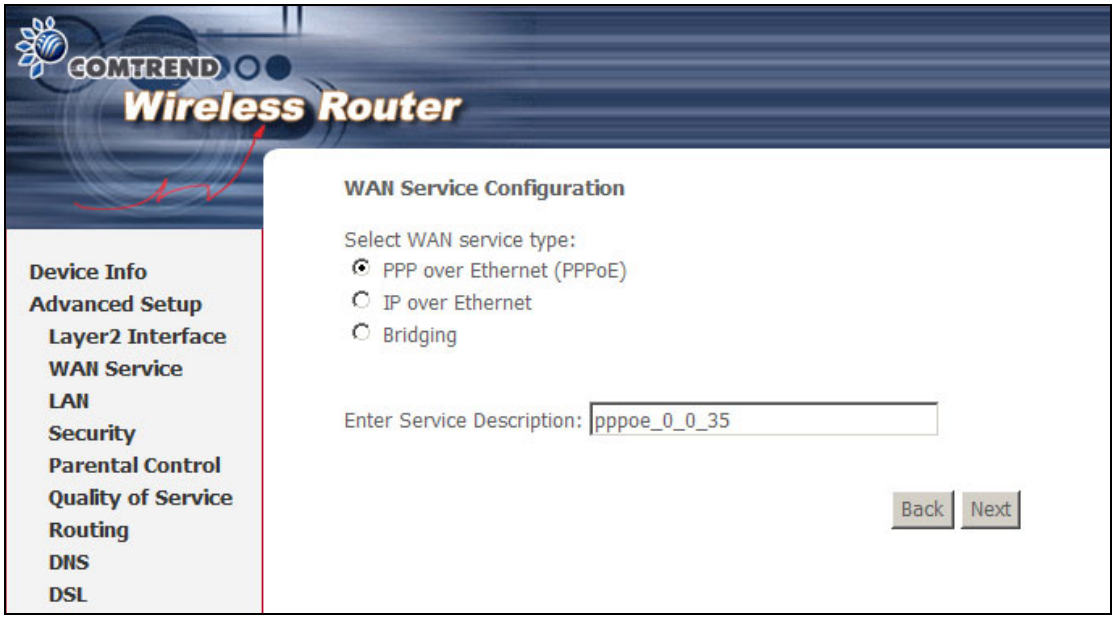
STEP 5: You will now follow the instructions specific to the WAN service type you wish to establish. This list should help you locate the correct procedure:

(1) For PPP over ETHERNET (PPPoE), go to page 118.
(2) For IP over ETHERNET (IPoE), go to page 122.
(3) For BRIDGING, go to page 126.
(4) For PPP over ATM (PPPoA), go to page 127.
(5) For IP over ATM (IPoA), go to page 131.

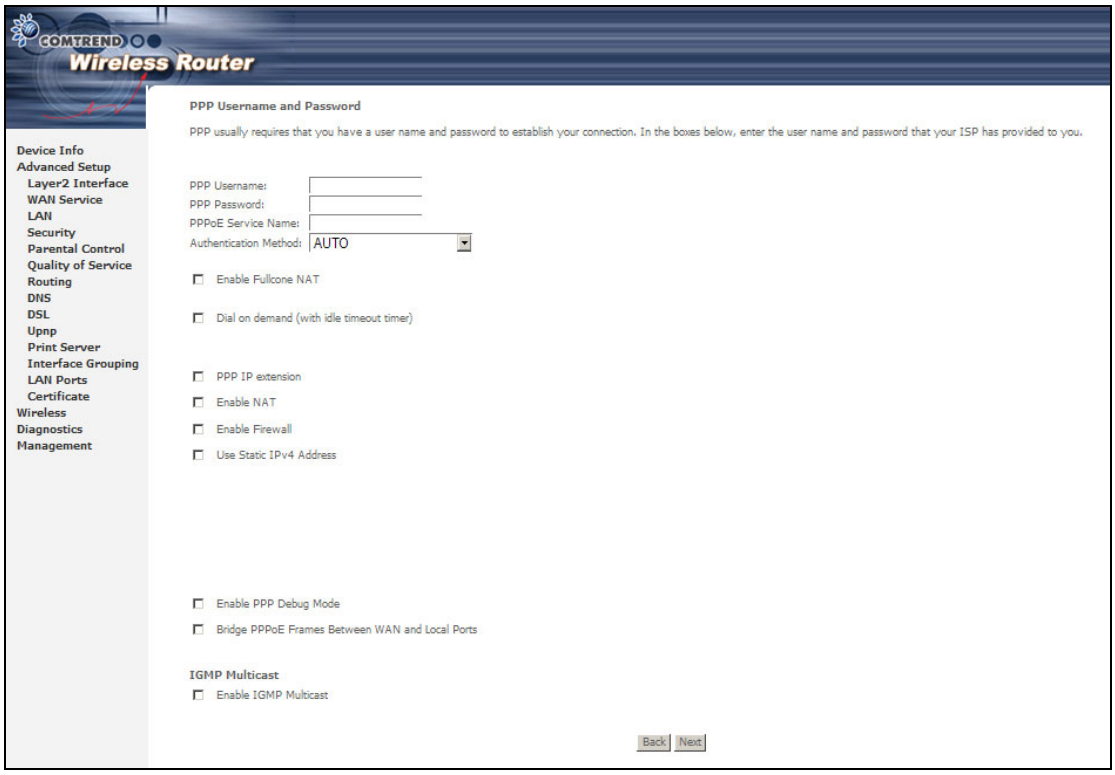
The subsections that follow continue the WAN service setup procedure.

H2.1 PPP over ETHERNET (PPPoE)

STEP 1: Select the PPP over Ethernet radio button and click **Next**.



STEP 2: On the next screen, enter the PPP settings as provided by your ISP. Click **Next** to continue or click **Back** to return to the previous step.



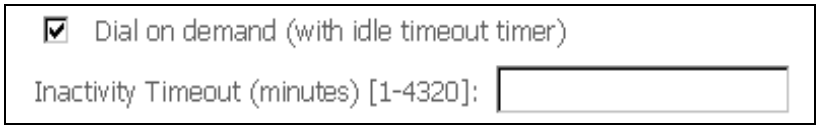
PPP SETTINGS

The PPP Username, PPP password and the PPPoE Service Name entries are dependent on the particular requirements of the ISP. The user name can be a

maximum of 256 characters and the password a maximum of 32 characters in length. For Authentication Method, choose from AUTO, PAP, CHAP, and MSCHAP.

ENABLE FULLCONE NAT
This option becomes available when NAT is enabled. Known as one-to-one NAT, all requests from the same internal IP address and port are mapped to the same external IP address and port. An external host can send a packet to the internal host, by sending a packet to the mapped external address.

DIAL ON DEMAND
The CT-5364A can be configured to disconnect if there is no activity for a period of time by selecting the **Dial on demand** checkbox ☑. You must also enter an inactivity timeout period in the range of 1 to 4320 minutes.



PPP IP EXTENSION
The PPP IP Extension is a special feature deployed by some service providers. Unless your service provider specifically requires this setup, do not select it.

PPP IP Extension does the following:

- Allows only one PC on the LAN.
- Disables NAT and Firewall.
- The device becomes the default gateway and DNS server to the PC through DHCP using the LAN interface IP address.
- The device extends the IP subnet at the remote service provider to the LAN PC. i.e. the PC becomes a host belonging to the same IP subnet.
- The device bridges the IP packets between WAN and LAN ports, unless the packet is addressed to the device's LAN IP address.
- The public IP address assigned by the remote side using the PPP/IPCP protocol is actually not used on the WAN PPP interface. Instead, it is forwarded to the PC LAN interface through DHCP. Only one PC on the LAN can be connected to the remote, since the DHCP server within the device has only a single IP address to assign to a LAN device.

ENABLE NAT
If the LAN is configured with a private IP address, the user should select this checkbox ☑. The NAT submenu will appear in the Advanced Setup menu after reboot. On the other hand, if a private IP address is not used on the LAN side (i.e. the LAN side is using a public IP), this checkbox ☑ should not be selected to free up system resources for better performance.

ENABLE FIREWALL
If this checkbox ☑ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox ☑ should not be selected to free up system resources for better performance.

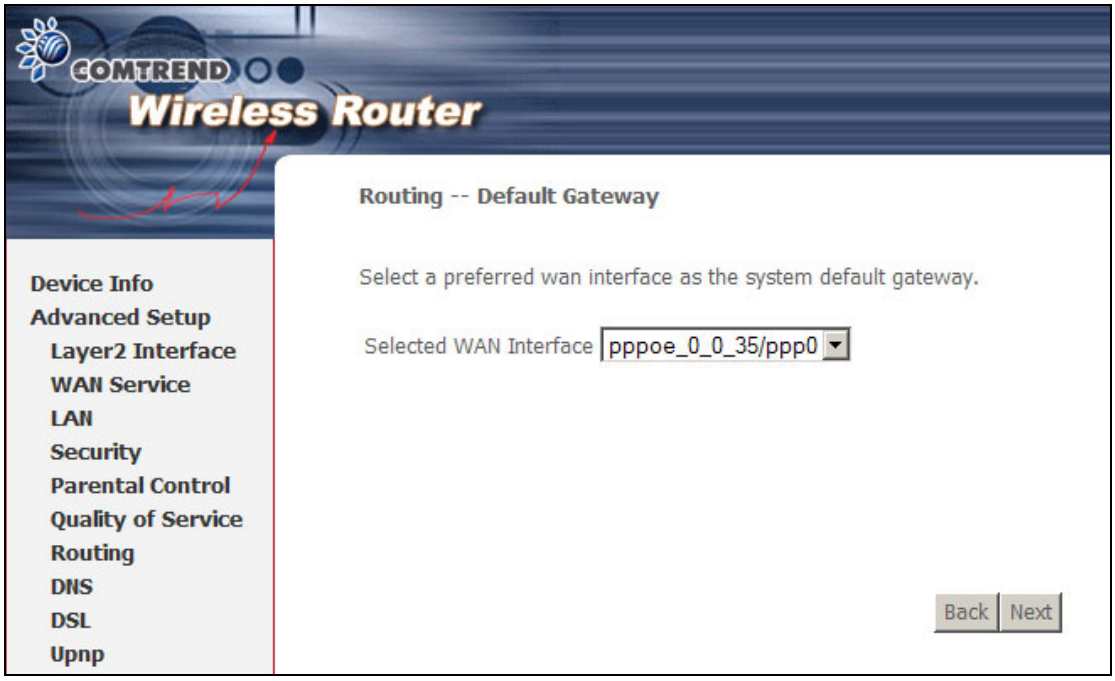
USE STATIC IPv4 ADDRESS
Unless your service provider specially requires it, do not select this checkbox ☑. If selected, enter the static IP address in the **IP Address** field. Also, don't forget to adjust the IP configuration to Static IP Mode as described in section 3.2.

ENABLE PPP DEBUG MODE
When this option is selected, the system will put more PPP connection information into the system log. This is for debugging errors and not for normal usage.

BRIDGE PPPOE FRAMES BETWEEN WAN AND LOCAL PORTS
When Enabled, this creates local PPPoE connections to the WAN side. Enable this option only if all LAN-side devices are running PPPoE clients, otherwise disable it. The CT-5364A supports pass-through PPPoE sessions from the LAN side while simultaneously running a PPPoE client from non-PPPoE LAN devices

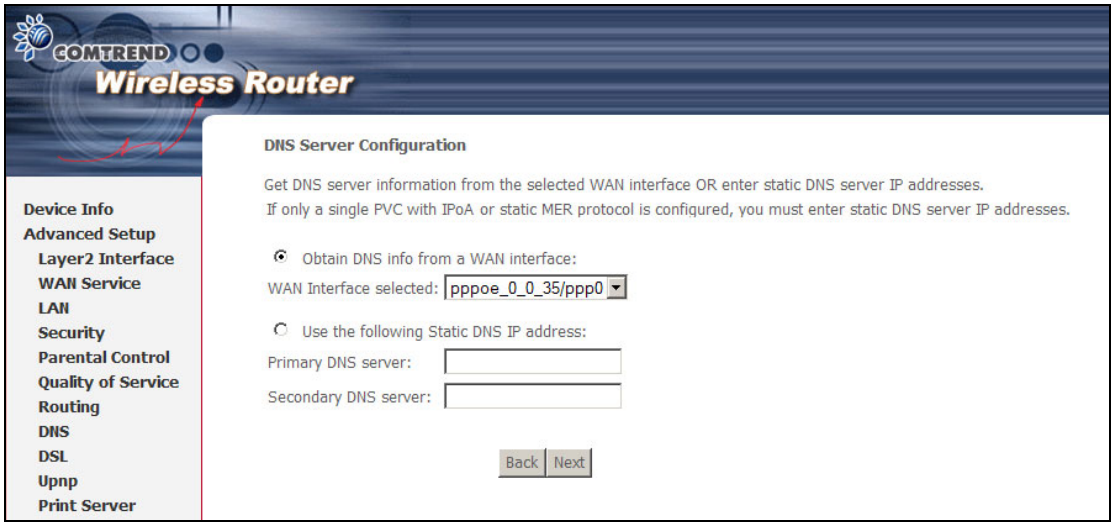
ENABLE IGMP MULTICAST
Tick the checkbox ☑ to enable Internet Group Membership Protocol (IGMP) multicast. IGMP is a protocol used by IP hosts to report their multicast group memberships to any neighboring multicast routers.

STEP 3: Select a WAN interface as the preferred default gateway route.



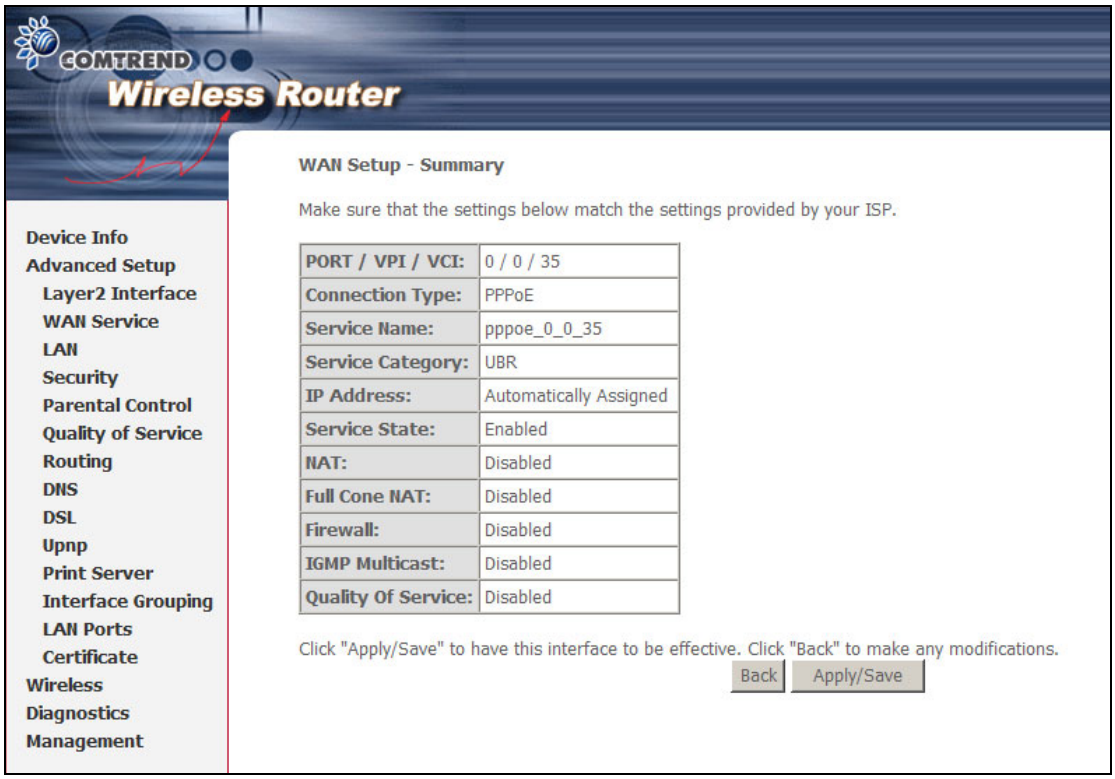
Click **Next** to continue or click **Back** to return to the previous step.

STEP 4: Select a WAN interface or enter a static IP address to the DNS Server.



Click **Next** to continue or click **Back** to return to the previous step.

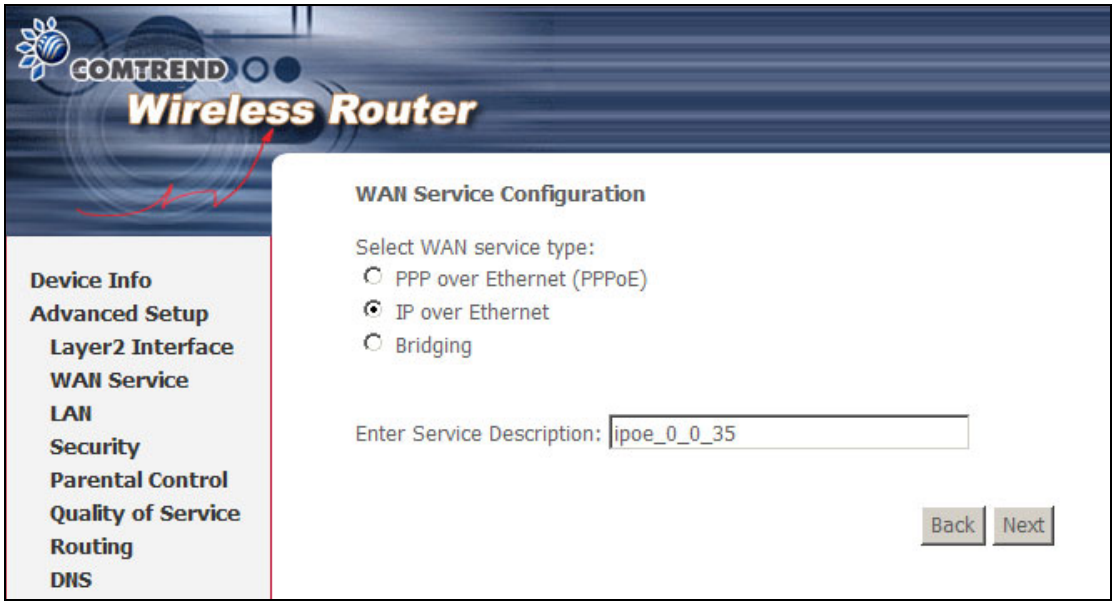
STEP 5: The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click **Apply/Save** if they are correct, or click **Back** to modify them.



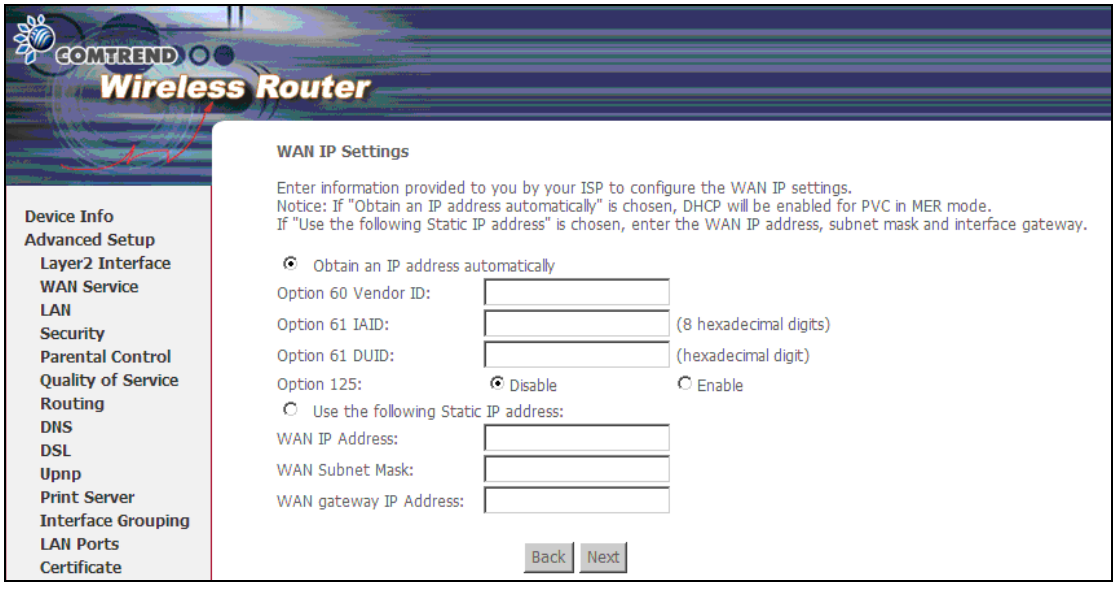
After clicking **Apply/Save**, the new service should appear on the main screen. To activate it you must reboot. Go to Management → Reboot and click **Reboot**.

H2.2 IP over ETHERNET (IPoE)

STEP 1: Select the IP over Ethernet radio button and click **Next**.

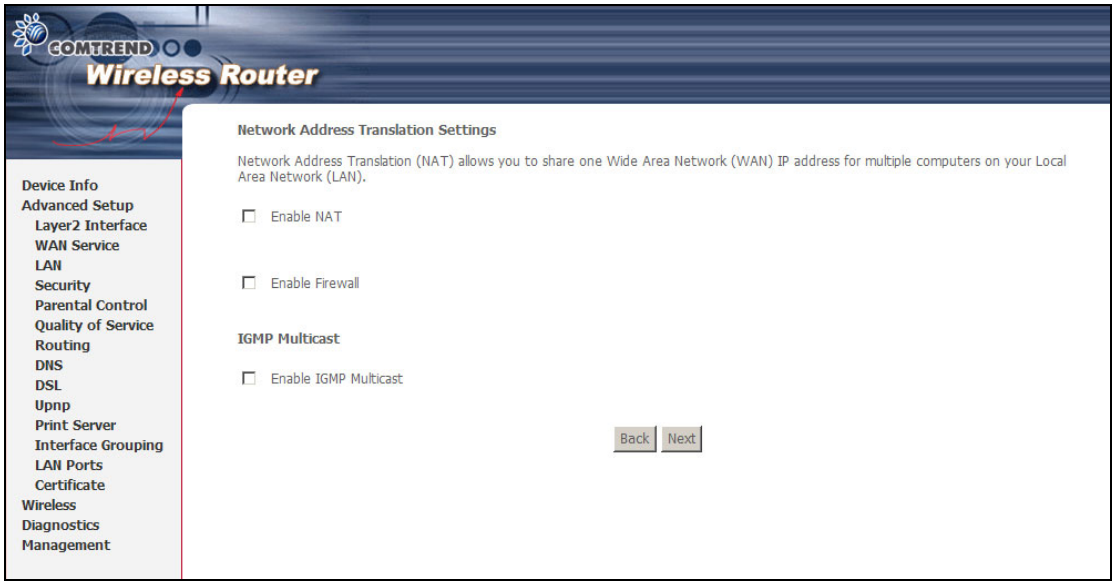


STEP 2: The WAN IP settings screen provides access to the DHCP server settings. You can select the **Obtain an IP address automatically** radio button to enable DHCP (use the DHCP Options only if necessary). However, if you prefer, you can instead use the **Static IP address** method to assign WAN IP address, Subnet Mask and Default Gateway manually.



Click **Next** to continue or click **Back** to return to the previous step.

STEP 3: This screen provides access to NAT, Firewall and IGMP Multicast settings. Enable each by selecting the appropriate checkbox ☑. Click **Next** to continue or click **Back** to return to the previous step.



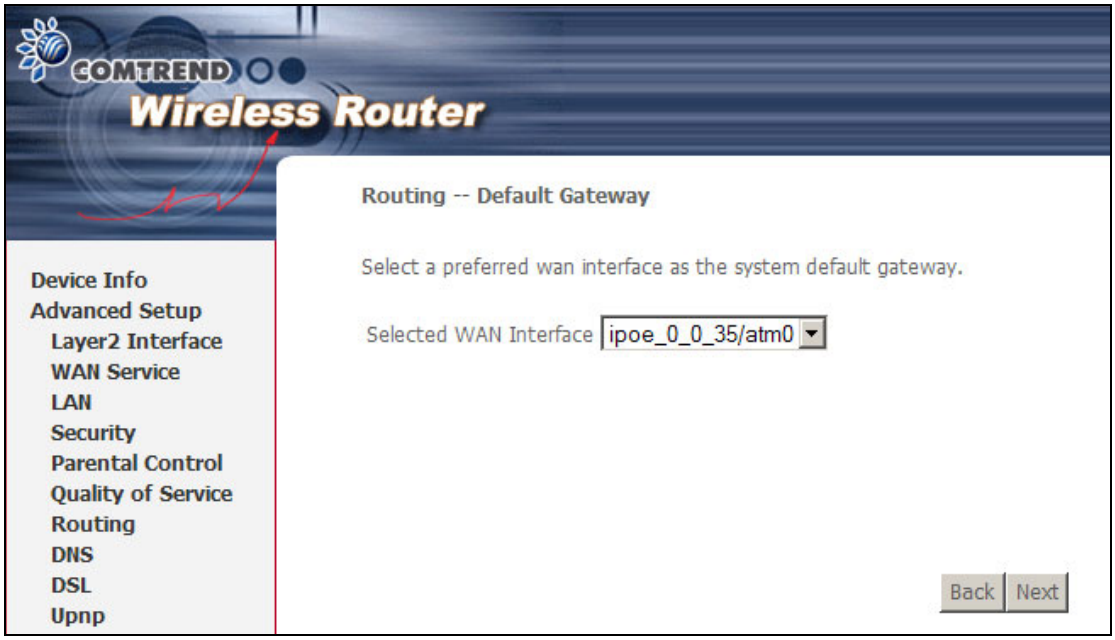
ENABLE NAT
If the LAN is configured with a private IP address, the user should select this checkbox ☑. The NAT submenu will appear in the Advanced Setup menu after reboot. On the other hand, if a private IP address is not used on the LAN side (i.e. the LAN side is using a public IP), this checkbox ☑ should not be selected, so as to free up system resources for improved performance.

ENABLE FULLCONE NAT
This option becomes available when NAT is enabled. Known as one-to-one NAT, all requests from the same internal IP address and port are mapped to the same external IP address and port. An external host can send a packet to the internal host, by sending a packet to the mapped external address.

ENABLE FIREWALL
If this checkbox ☑ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox ☑ should not be selected so as to free up system resources for better performance.

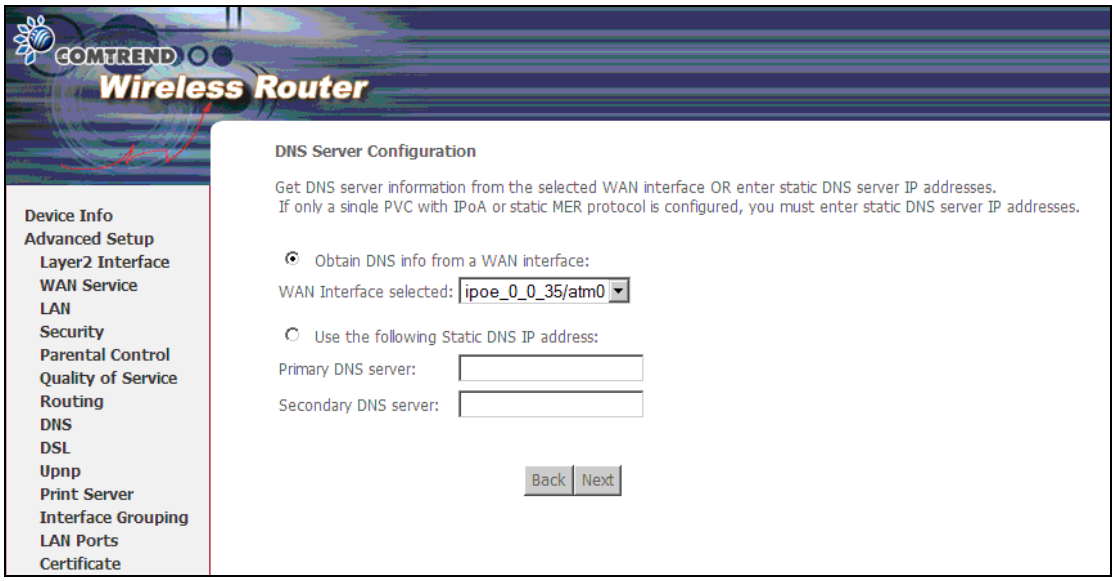
ENABLE IGMP MULTICAST
Tick the checkbox ☑ to enable Internet Group Membership Protocol (IGMP) multicast. IGMP is a protocol used by IP hosts to report their multicast group memberships to any neighboring multicast routers.

STEP 4: Select a WAN interface as the preferred default gateway route.



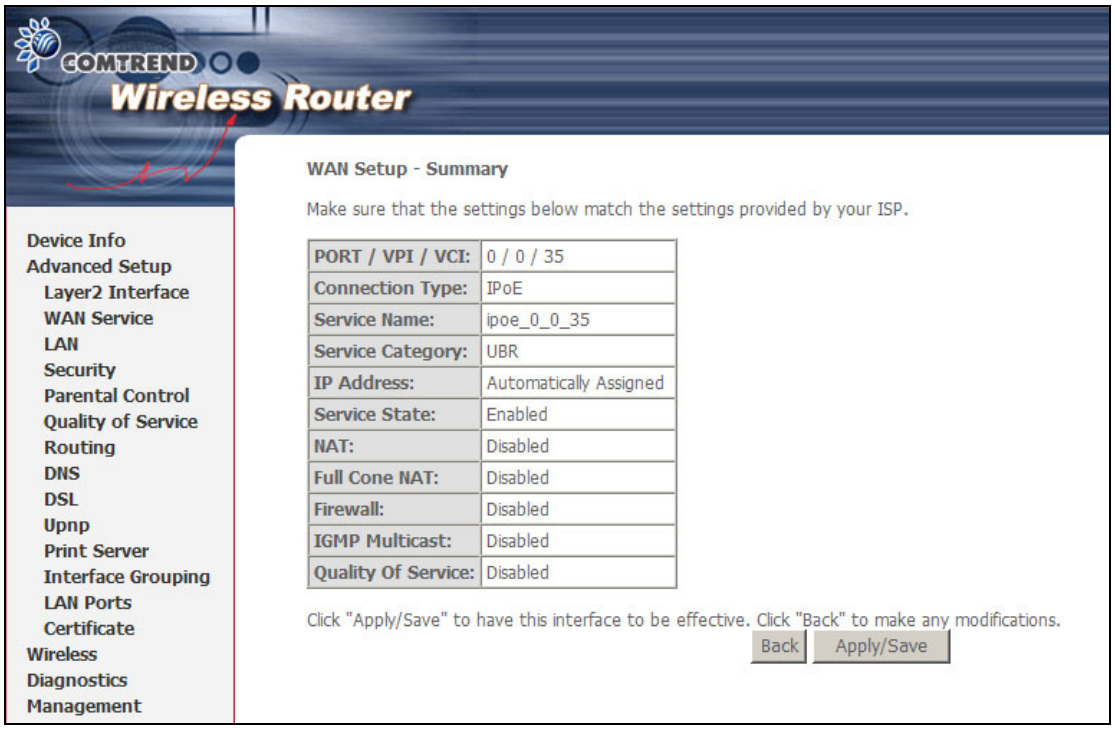
Click **Next** to continue or click **Back** to return to the previous step.

STEP 5: Select a WAN interface or enter a static IP address to the DNS Server.



Click **Next** to continue or click **Back** to return to the previous step.

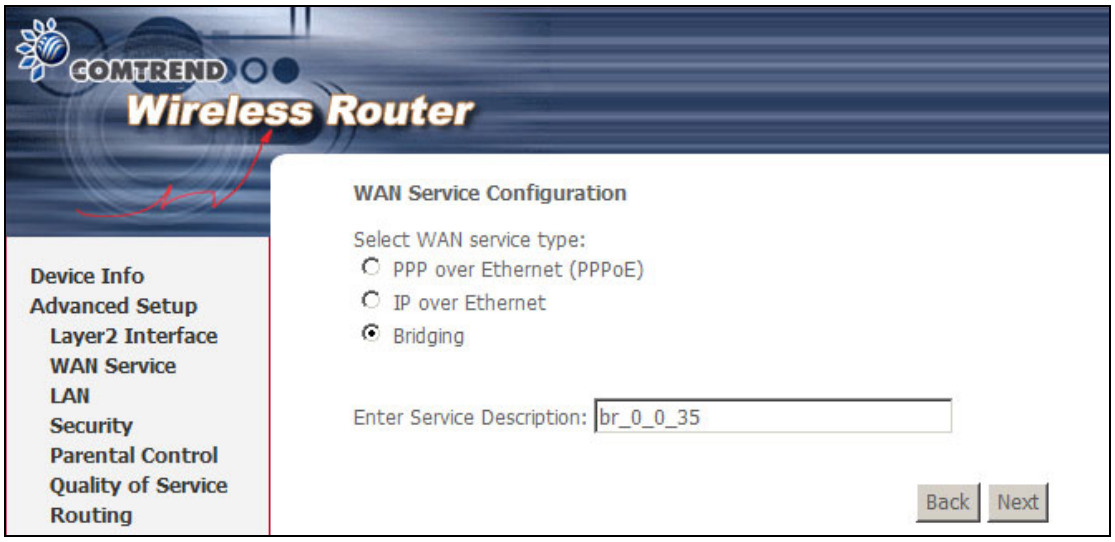
STEP 6: The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click **Apply/Save** if they are correct, or click **Back** to modify them.



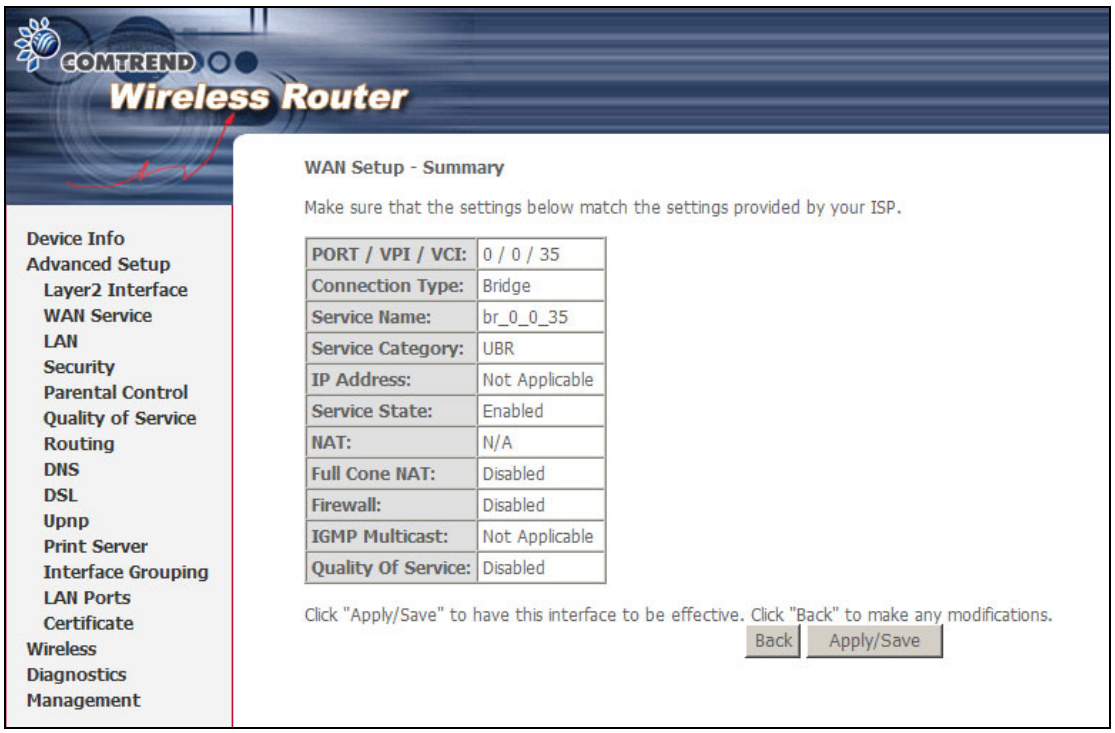
After clicking **Apply/Save**, the new service should appear on the main screen. To activate it you must reboot. Go to Management → Reboot and click **Reboot**.

H2.3 BRIDGING

STEP 1: Select the Bridging radio button and click **Next**.



STEP 2: The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click **Apply/Save** if they are correct, or click **Back** to return to the previous screen.



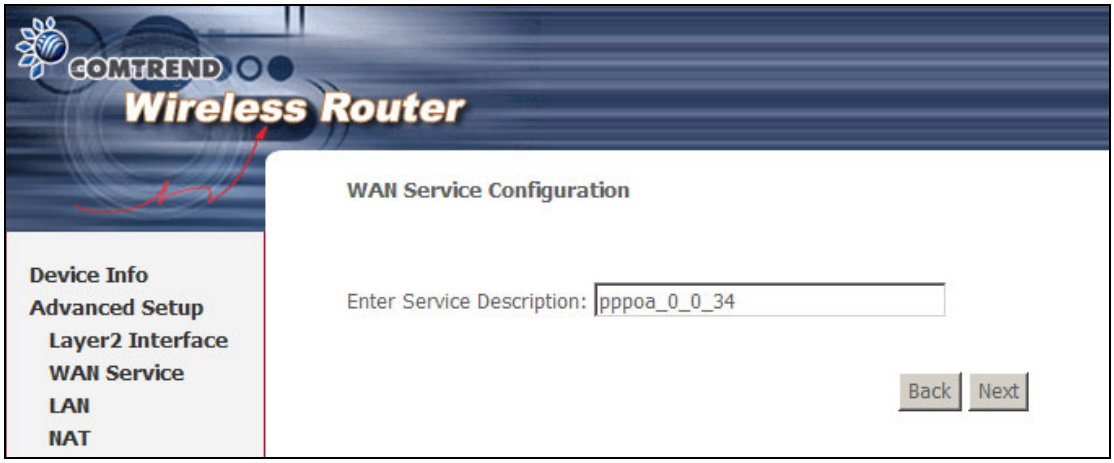
After clicking **Apply/Save**, the new service should appear on the main screen. To activate it you must reboot. Go to Management → Reboot and click **Reboot**.

NOTES: If this bridge connection is your only WAN service, your PC IP settings will need to be assigned statically (see section 3.2), since the on-board DHCP server is not active in bridge mode.

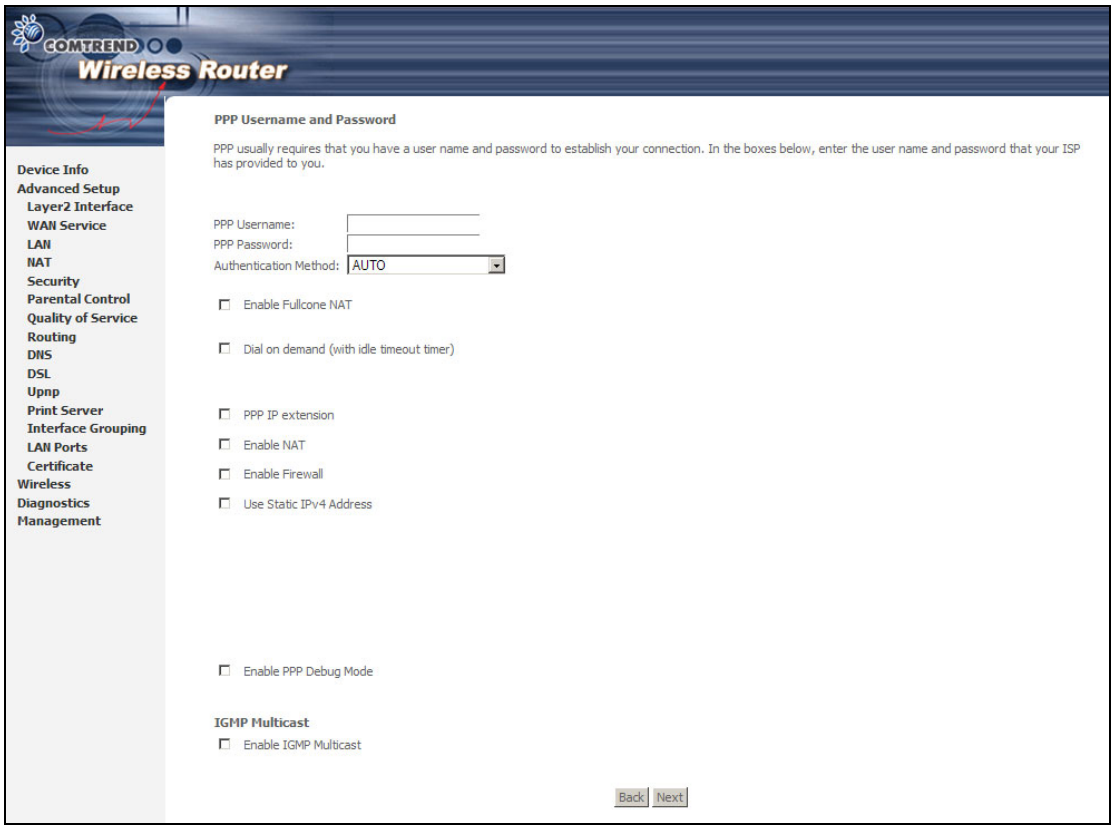
Similarly, the CT-5364A cannot be accessed from the WAN, for remote management or technical support, since no WAN IP address is available.

H2.4 PPP over ATM (PPPoA)

STEP 1: Click **Next** to continue.



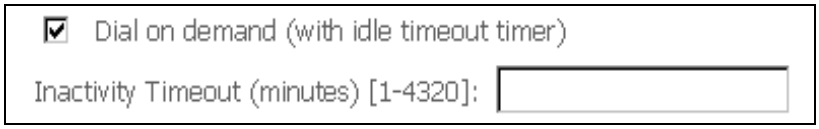
STEP 2: On the next screen, enter the PPP settings as provided by your ISP. Click **Next** to continue or click **Back** to return to the previous step.



PPP SETTINGS
The PPP username and password are dependent on the requirements of the ISP. The user name can be a maximum of 256 characters and the password a maximum of 32 characters in length. (Authentication Method: AUTO, PAP, CHAP, or MSCHAP.)

ENABLE FULLCONE NAT
This option becomes available when NAT is enabled. Known as one-to-one NAT, all requests from the same internal IP address and port are mapped to the same external IP address and port. An external host can send a packet to the internal host, by sending a packet to the mapped external address.

DIAL ON DEMAND
The CT-5364A can be configured to disconnect if there is no activity for a period of time by selecting the **Dial on demand** checkbox ☑. You must also enter an inactivity timeout period in the range of 1 to 4320 minutes.



PPP IP EXTENSION
The PPP IP Extension is a special feature deployed by some service providers. Unless your service provider specifically requires this setup, do not select it.

PPP IP Extension does the following:

- Allows only one PC on the LAN.
- Disables NAT and Firewall.
- The device becomes the default gateway and DNS server to the PC through DHCP using the LAN interface IP address.
- The device extends the IP subnet at the remote service provider to the LAN PC. i.e. the PC becomes a host belonging to the same IP subnet.
- The device bridges the IP packets between WAN and LAN ports, unless the packet is addressed to the device's LAN IP address.
- The public IP address assigned by the remote side using the PPP/IPCP protocol is actually not used on the WAN PPP interface. Instead, it is forwarded to the PC LAN interface through DHCP. Only one PC on the LAN can be connected to the remote, since the DHCP server within the device has only a single IP address to assign to a LAN device.

ENABLE NAT
If the LAN is configured with a private IP address, the user should select this checkbox ☑. The NAT submenu will appear in the Advanced Setup menu after reboot. On the other hand, if a private IP address is not used on the LAN side (i.e. the LAN side is using a public IP), this checkbox ☑ should not be selected to free up system resources for better performance.

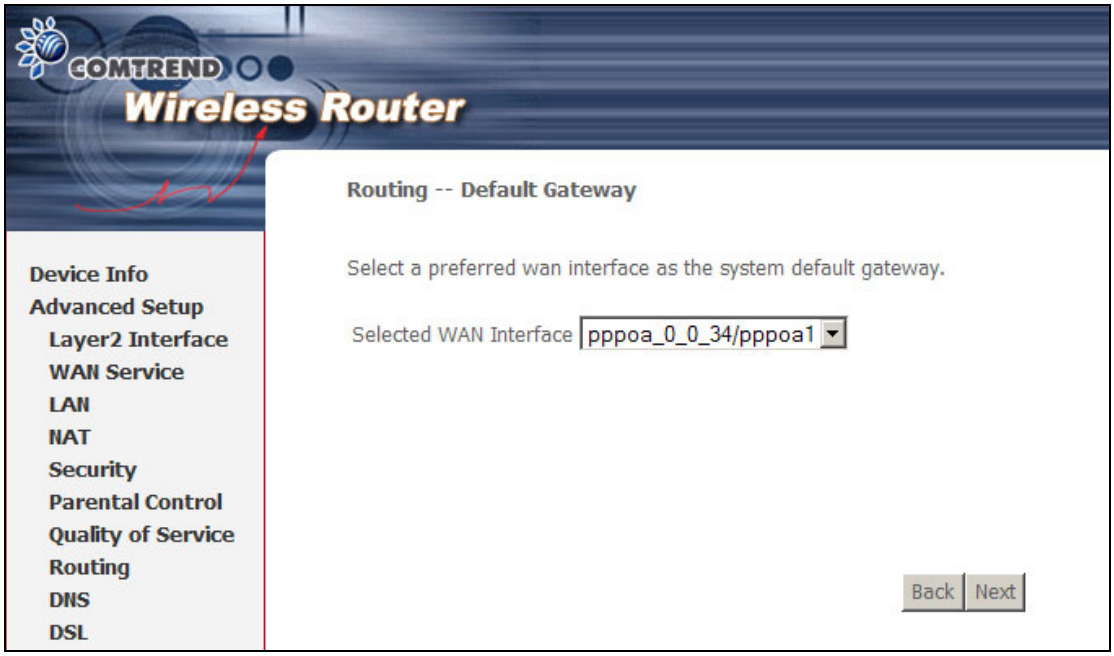
ENABLE FIREWALL
If this checkbox ☑ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox ☑ should not be selected to free up system resources for better performance.

USE STATIC IPv4 ADDRESS
Unless your service provider specially requires it, do not select this checkbox ☑. If selected, enter the static IP address in the **IP Address** field. Also, don't forget to adjust the IP configuration to Static IP Mode as described in section 3.2.

ENABLE PPP DEBUG MODE
When this option is selected, the system will put more PPP connection information into the system log. This is for debugging errors and not for normal usage.

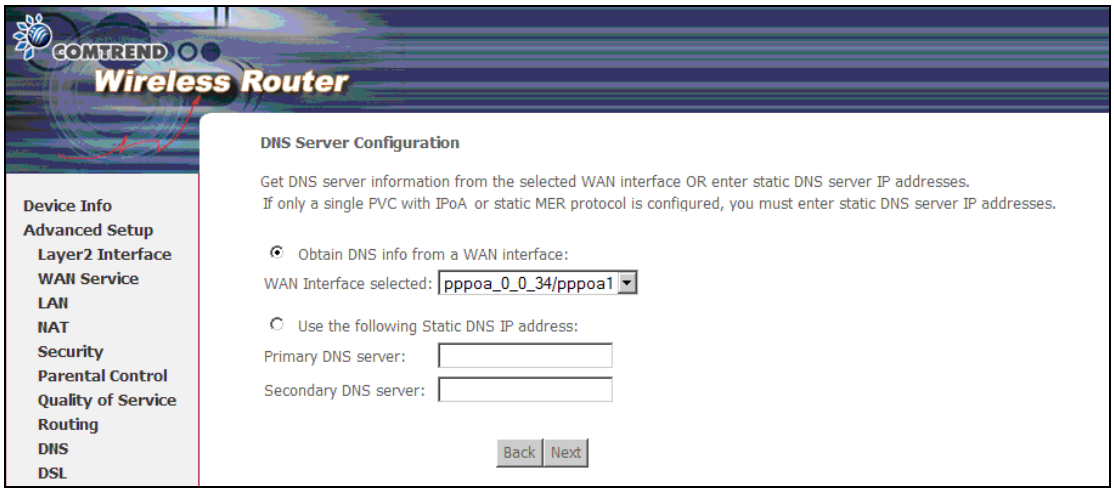
ENABLE IGMP MULTICAST
Tick the checkbox ☑ to enable Internet Group Membership Protocol (IGMP) multicast. IGMP is a protocol used by IP hosts to report their multicast group memberships to any neighboring multicast routers.

STEP 3: Select a WAN interface as the preferred default gateway route.



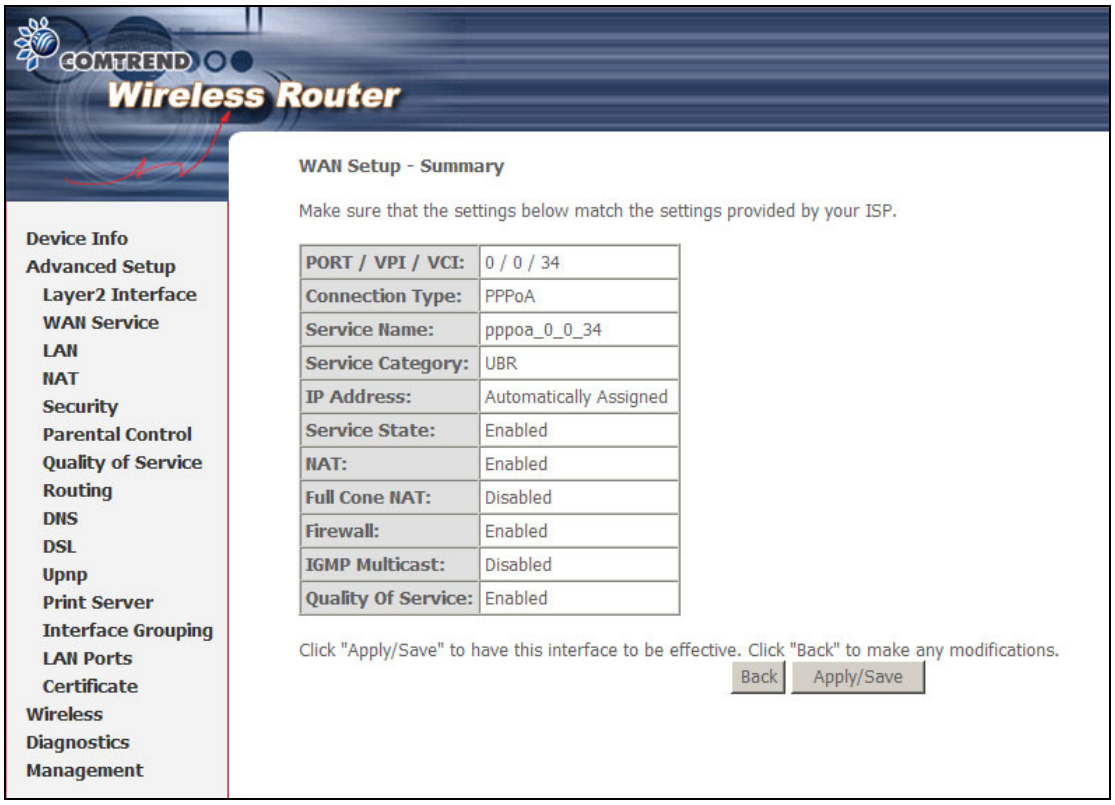
Click **Next** to continue or click **Back** to return to the previous step.

STEP 4: Select a WAN interface or enter a static IP address to the DNS Server.



Click **Next** to continue or click **Back** to return to the previous step.

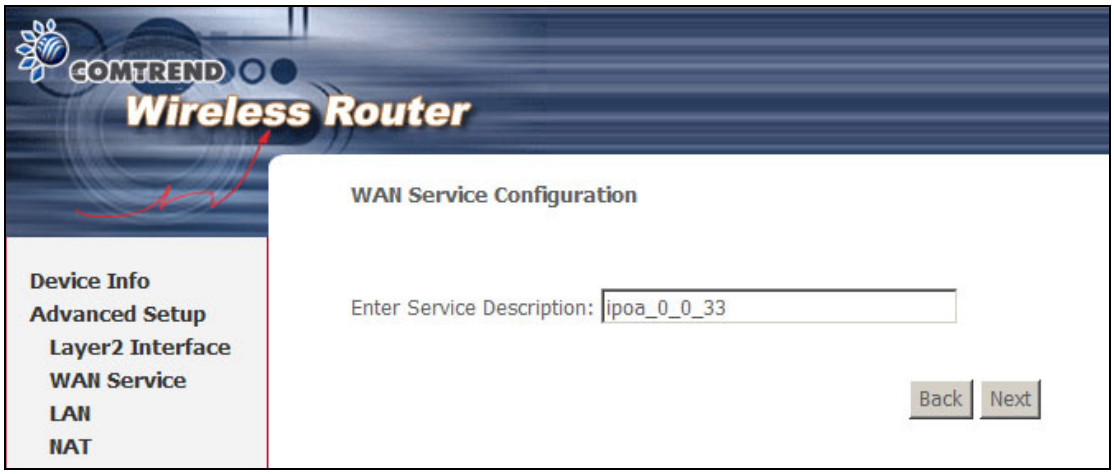
STEP 5: The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click **Apply/Save** if they are correct, or click **Back** to modify them.



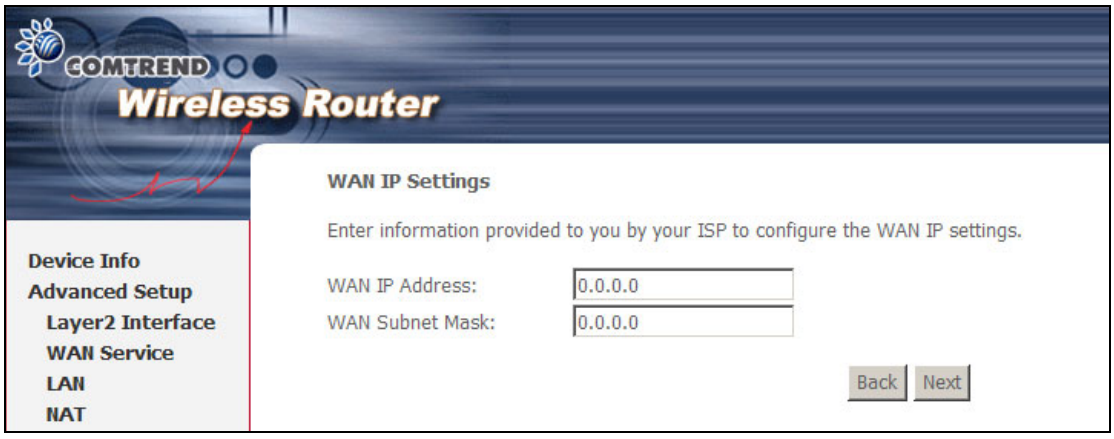
After clicking **Apply/Save**, the new service should appear on the main screen. To activate it you must reboot. Go to Management → Reboot and click **Reboot**.

H2.5 IP over ATM (IPoA)

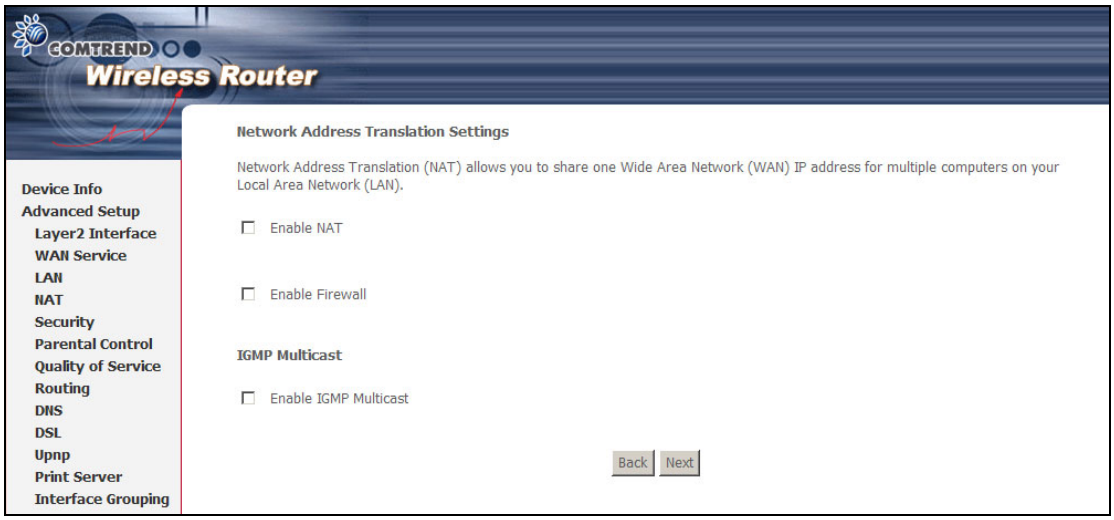
STEP 1: Click **Next** to continue.



STEP 2: Enter the WAN IP settings provided by your ISP. Click **Next** to continue.



STEP 3: This screen provides access to NAT, Firewall and IGMP Multicast settings. Enable each by selecting the appropriate checkbox ☑. Click **Next** to continue or click **Back** to return to the previous step.



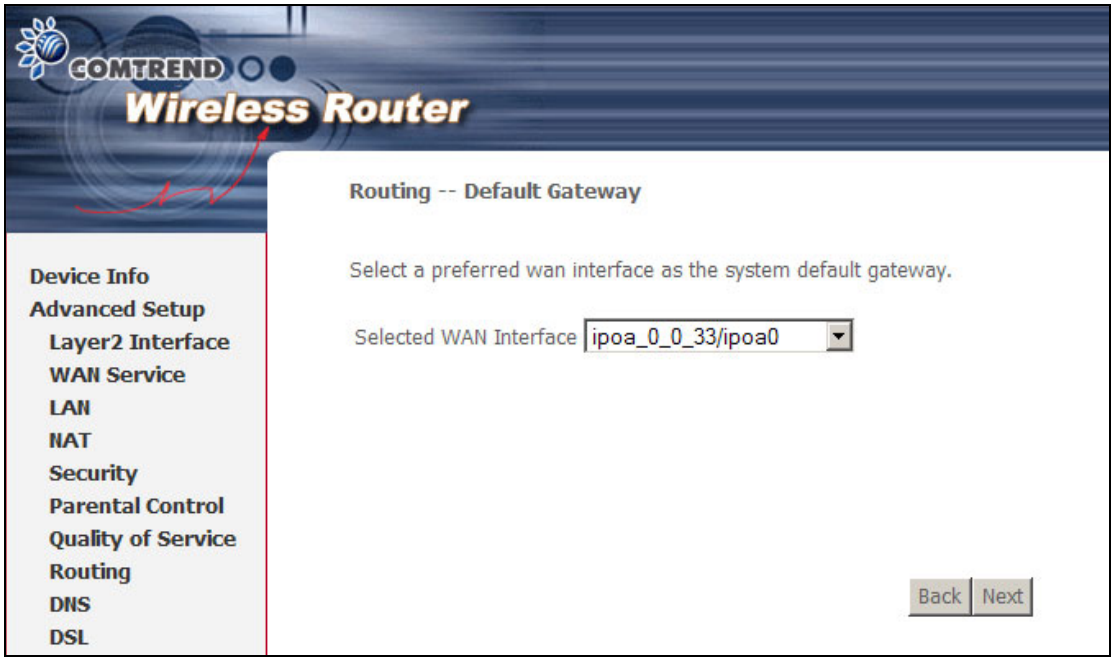
ENABLE NAT
If the LAN is configured with a private IP address, the user should select this checkbox ☑. The NAT submenu will appear in the Advanced Setup menu after reboot. On the other hand, if a private IP address is not used on the LAN side (i.e. the LAN side is using a public IP), this checkbox ☑ should not be selected, so as to free up system resources for improved performance.

ENABLE FULLCONE NAT
This option becomes available when NAT is enabled. Known as one-to-one NAT, all requests from the same internal IP address and port are mapped to the same external IP address and port. An external host can send a packet to the internal host by sending a packet to the mapped external address.

ENABLE FIREWALL
If this checkbox ☑ is selected, the Security submenu will be displayed on the Advanced Setup menu after reboot. If firewall is not necessary, this checkbox ☑ should not be selected so as to free up system resources for better performance.

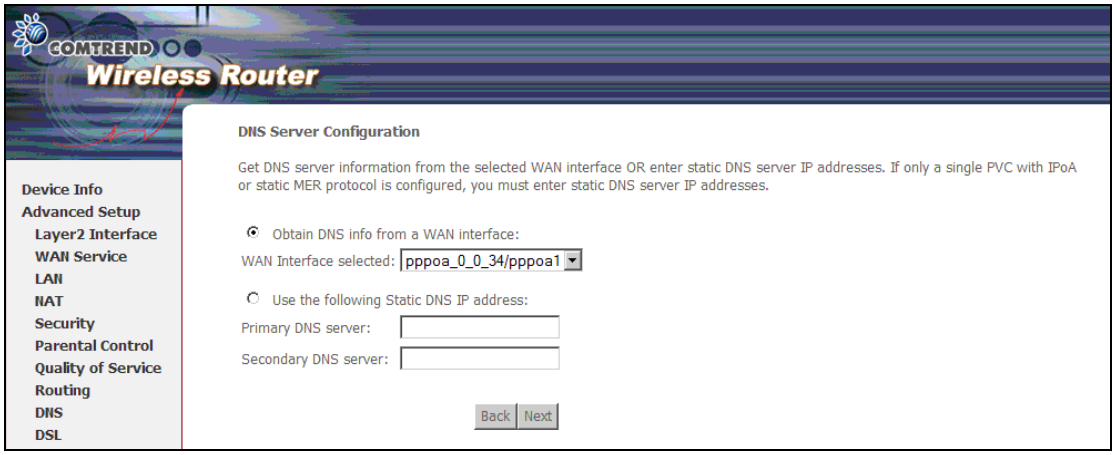
ENABLE IGMP MULTICAST
Tick the checkbox ☑ to enable Internet Group Membership Protocol (IGMP) multicast. IGMP is a protocol used by IP hosts to report their multicast group memberships to any neighboring multicast routers.

STEP 4: Select a WAN interface as the preferred default gateway route.



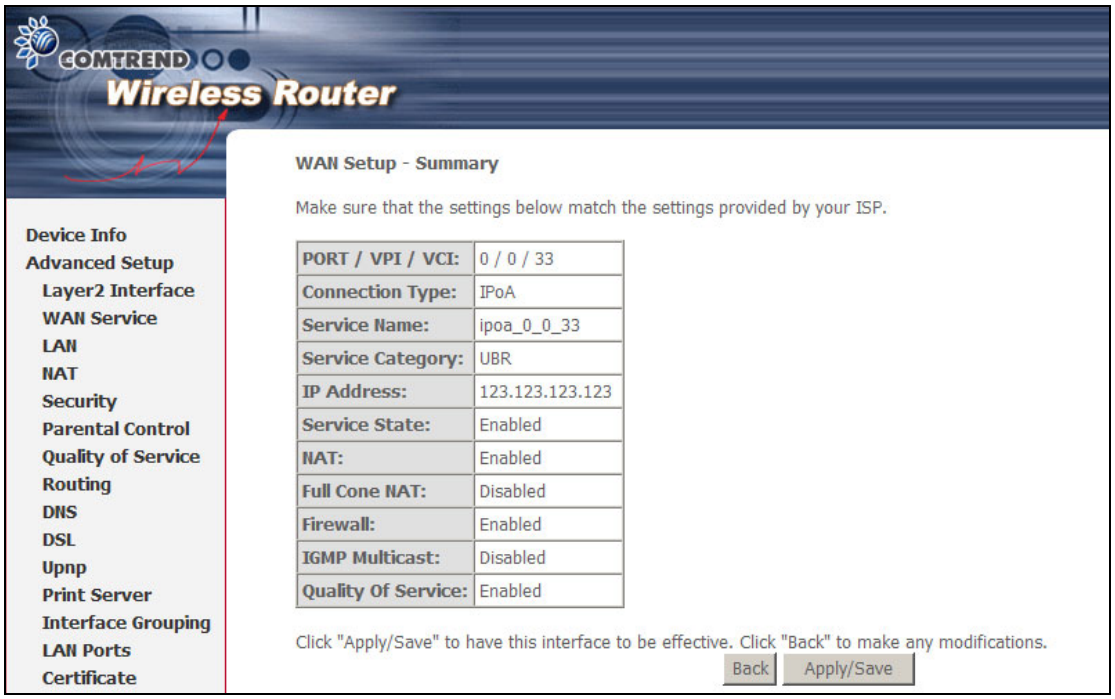
Click **Next** to continue or click **Back** to return to the previous step.

STEP 5: Select a WAN interface or enter a static IP address to the DNS Server.



Click **Next** to continue or click **Back** to return to the previous step.

STEP 7: The WAN Setup - Summary screen shows a preview of the WAN service you have configured. Check these settings and click **Apply/Save** if they are correct, or click **Back** to modify them.



After clicking **Apply/Save**, the new service should appear on the main screen. To activate it you must reboot. Go to Management → Reboot and click **Reboot**.

H3 ~ More About MSC Mode

The procedure for WAN connection setup in MSC mode is as follows:

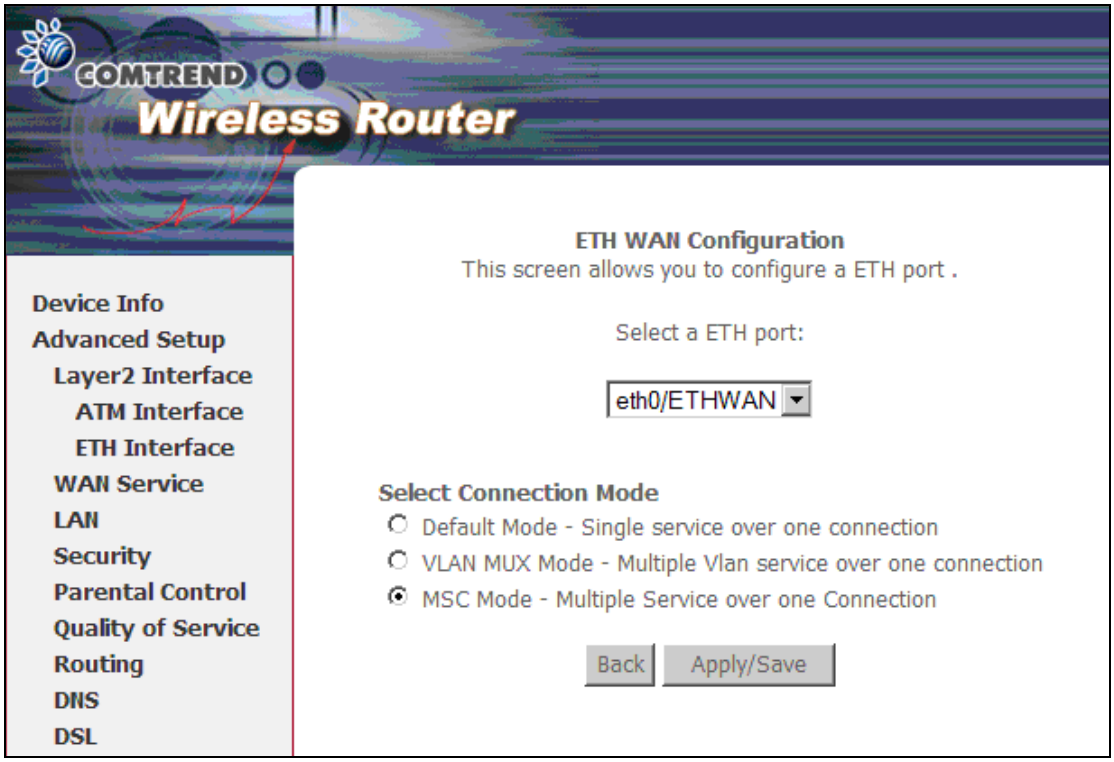
STEP 1: Create a Layer2 interface in MSC connection mode.

STEP 2: Add WAN connections to the interface (Bridge, PPPoE or IPoE).

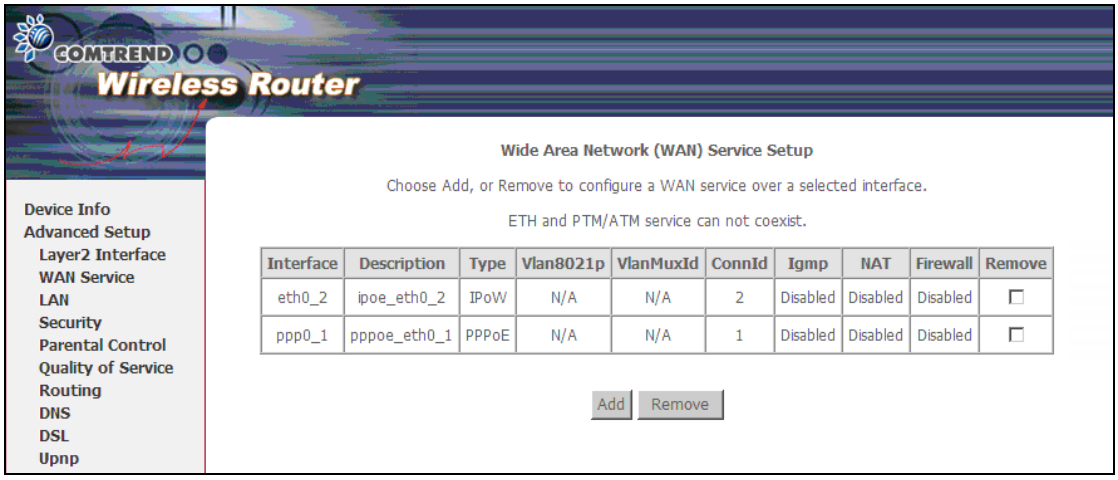
STEP 3: Use Interface Grouping to connect LAN and WAN interfaces.

These three steps are repeated below with screenshots added for reference.

STEP 1: Create a Layer2 interface in MSC connection mode.

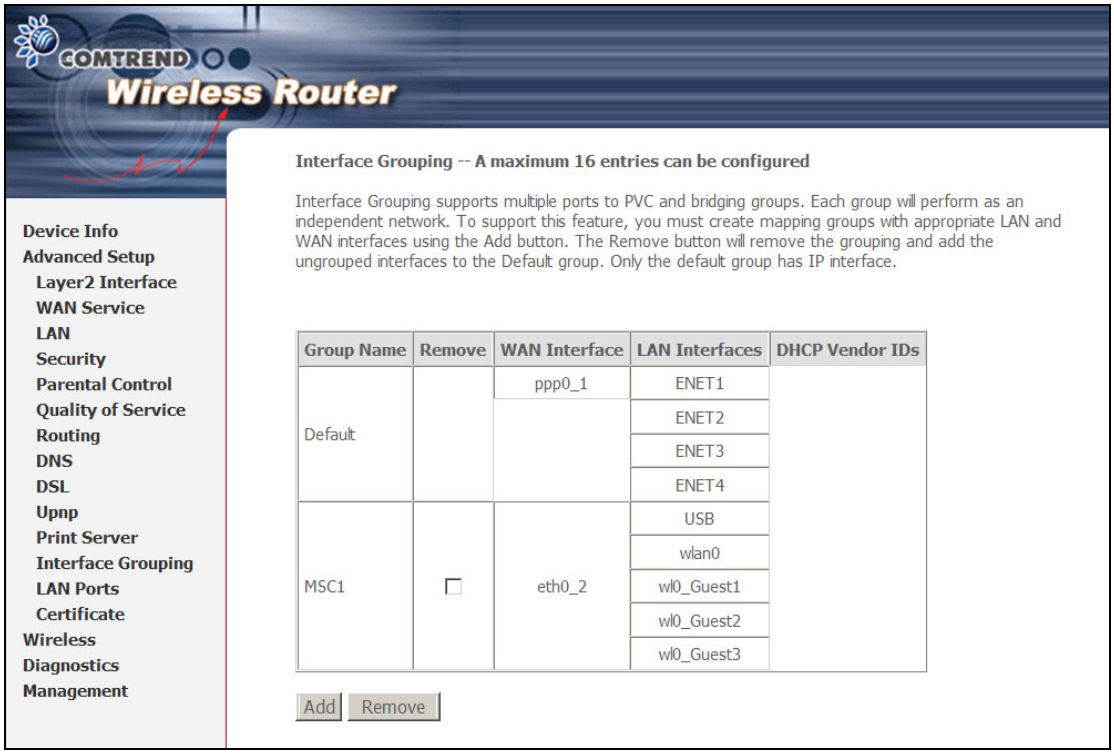


STEP 2: Add WAN connections to the interface (IPoE or PPPoE).



NOTES:	If QoS is configured on the first MSC connection, it will be configured by default for all subsequent connections. If a MSC connection is removed every other MSC connection should be removed to avoid potential configuration problems.

STEP 3: Add an Interface Grouping (MSC1) to connect LAN and WAN interfaces.



See the instructions in Interface Grouping for help with this final step.